RCA VICTOR
SERVICE DATA

1943 • 1946

RADIO RECEIVERS
PHONOGRAPHS
TELEVISION

RADIO CORPORATION OF AMERICA
RCA Victor Division Camden, N. J., U. S. A.

"HIS MASTER'S VOICE"

RCA VICTOR
SERVICE DATA

RADIO RECEIVERS
PHONOGRAPHS
TELEVISION

This volume is a compilation of Service Data previously issued for the years 1943 to 1946 and early 1947 inclusive, with the latest changes and corrections.

In the index two listings are made; "Index to Model Number" and "Index to Chassis Number." The column titled "Supp. Data" refers to last minute information and other data not contained in the service data on the listed model.

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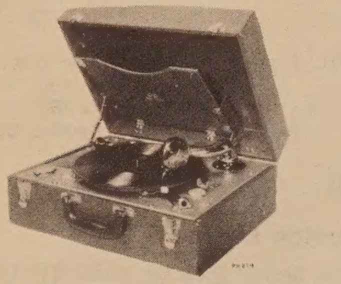
SUPPLEMENTARY DATA

(1) 5H1, 5H2

Service Data:

Service data for Model 5H applies to these two models with the exception of miscellaneous parts and cabinet appearances which differ slightly.



Model 5H2

(2) Q10 SERIES (RC-594C)

Cabinet Stock Nos.:

Models Q10, Q10A
Stock No. Y-1056 Cabinet—Brown plastic cabinet.
Models Q10-2, Q10A-2
Stock No. Y-1140 Cabinet—Ivory plastic cabinet.

(3) Q-10-3 (RC-594C)

Service Data

This instrument is identical to other sets of the Q10 series (RC-594C), with the exception of the cabinet which is black and using ivory color knobs.

Replacement Parts

As listed for Q10 series except:
Add Stock No.:

Y1412	Cabinet—Black plastic cabinet (Q10-3).
70374	Cord—Power cord (Q10-3).
35121	Knob—Range switch knob (Q10-3).
70414	Knob—Volume control or tuning knob (Q10-3).

(4) 54B6 (RC-589UE)

Service Data:

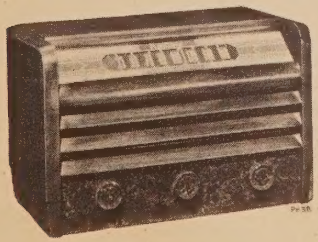
Service data for Model 54B1 2nd Prod. (RC-589U) applies to this model with the exception of the parts listed below:

CHASSIS ASSEMBLIES

73284	Fastener—Push fastener to hold loop—chrome (2 required)
73281	Hinge—Lid hinge—ivory (2 required)
73276	Lid—Case lid complete with lid support less loop—ivory
73282	Loop—Antenna loop complete with connectors, less lid—ivory
73280	Plate—Backing plate for mounting hinge on lid—chrome (2 required)
73279	Screw—Case cover mounting screw (1 set)—ivory

MISCELLANEOUS

73286	Bottom—Case bottom—ivory
73277	Center—Case center—gold
73287	Handle—Carrying handle—tan
73288	Link—Handle link— (2 required)



Radiola 61-3

(5) 56X5 (RC-1023)
56X10 (RC-1023B)

Extra Coupling Turn on Oscillator Coil

A number of these receivers have an oscillator coil in which the connecting lead is wrapped around the coil to increase feedback coupling. This was done because the coupling of some coils as manufactured was insufficient to insure satisfactory oscillator performance on the lower end of the short wave band.

When servicing receivers having this extra turn on the oscillator coil, it should be replaced in its original location and direction. Coils supplied for replacement purposes do not need this extra turn and it should be omitted when replacing the coil with Stock No. 39892.

(6) 58V, 58AV, 59V1, 59AV1

Push Button Oscillator Coils

A change was made in the push button assembly to permit easier adjustment of the #1 and #6 push buttons at the end frequency limits.

#1 coil (low frequency end) was originally a 50-turn coil with no color coding. This has been susperseded by a 52-turn coil with an identifying RED spot of paint on the coil form.

#6 coil (high frequency end) was originally a 46-turn coil with an identifying YELLOW spot of paint on the coil form. This has been superseded by a 43-turn coil with an identifying GREEN spot of paint on the coil form.

(7) RADIOLA 61-1, 61-2, 61-3 (RC-1011, RC-1011A, RC-1011B)

Service Data:

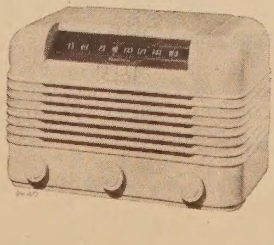
Service data on Model 56X applies to these models with the exception of the parts listed below:

CHASSIS ASSEMBLIES

36236	Indicator—Station selector indicator for 61-1 and 61-2.
37068	Indicator—Station selector indicator for 61-3.

MISCELLANEOUS ASSEMBLIES

39953	Back—Cabinet back for Radiola 61-1
70409	Back—Cabinet back for Radiola 61-2
70415	Back—Cabinet back for Radiola 61-3
36890	Clamp—Dial clamp, left hand, for Radiola 61-1 and 61-2
36891	Clamp—Dial clamp, right hand, for Radiola 61-1 and 61-2
X1602	Cloth—Grille cloth for Radiola 61-3
71017	Decal—Control panel decal for Radiola 61-3
70704	Dial—Glass dial scale for Radiola 61-1 and 61-2
70705	Dial—Glass dial scale for Radiola 61-3
37831	Fastener—Push fastener (1 set) for cabinet backs on Radiola 61-1 and 61-2
33006	Feet—Rubber feet for cabinet (4 required)
71016	Knob—Control knob (walnut) for Radiola 61-1
70414	Knob—Control knob (ivory) for Radiola 61-2
36722	Knob—Control knob (walnut) for Radiola 61-3
30900	Spring—Retaining spring for knob



Radiola 61-1 (Walnut)
Radiola 61-2 (Ivory)

(8) RADIOLA 61-5 (RC-1023)
RADIOLA 61-10 (RC-1023B)

Service Data:

Service data for Models 56X5 and 56X10 applies to these models with the exception of the parts listed below:

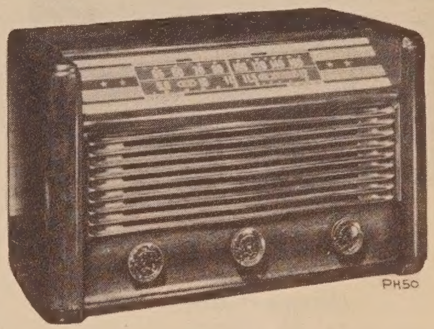
MISCELLANEOUS ASSEMBLIES

Radiola 61-5

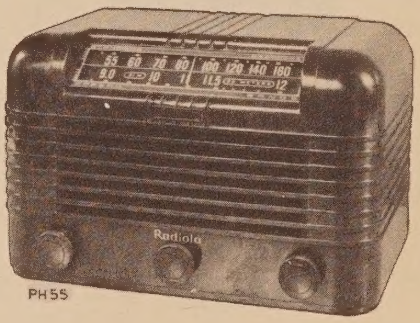
70415	Back—Cabinet back
X1603	Cloth—Grille cloth
70706	Dial—Glass dial scale
33006	Feet—Rubber feet for cabinet (4 required)
36886	Knob—Range switch knob
36722	Knob—Tuning or volume control knob
30900	Spring—Retaining spring for knobs

Radiola 61-10

39953	Back—Cabinet back
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
71395	Dial—Glass dial scale
37831	Fastener—Push fastener (1 set) for cabinet back
71016	Knob—Control knob
30900	Spring—Retaining spring for knobs



61-5 (Wood)



61-10 (Brown Plastic)

(9) RADIOLA 61-10 (RC-1023C)

Service Data:

Service Data on Radiola 61-10 using Chassis No. RC-1023C is identical to that published for Radiola 61-10 using Chassis No. RC-1023B

(10) POSTONE (PX) 61-10 (RC-1023B)

Service Data:

Service data on Radiola 61-10 applies to this model.

(11) RADIOLA 62-1 (RC-1017A)

Service Data:

Service data on Model 65U-1 applies to this model with the exception of the parts listed below:

MISCELLANEOUS

70709	Dial—Glass dial scale

Stock Nos. 71984 and 71986 Decals are not used.

SUPPLEMENTARY DATA (Continued)

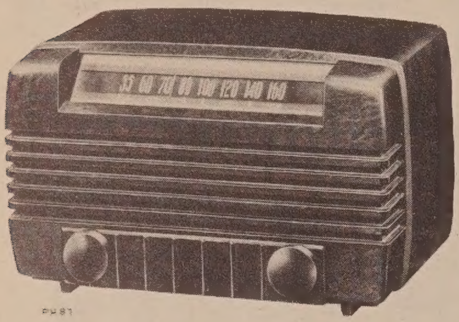
(12) RADIOLA 61-8, 61-9 (RC-1034, RC-1064)

Service Data:

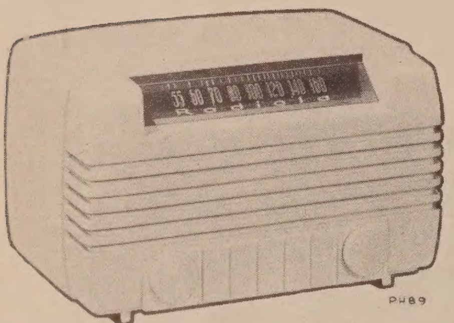
Service data on Model 65X1 applies to these models with the exception of the parts listed below:

MISCELLANEOUS

71794	Back—Cabinet back for Radiola 61-8
71795	Back—Cabinet back for Radiola 61-9
X1365	Cabinet—Brown plastic cabinet for Radiola 61-8
Y1366	Cabinet—Ivory plastic cabinet for Radiola 61-9
71796	Dial—Glass dial scale
70473	Knob—Control knob — red-brown — for Radiola 61-8
71821	Knob—Control knob — maroon — for Radiola 61-8
70474	Knob—Control knob—ivory—for Radiola 61-9



61-8
(Brown Plastic)

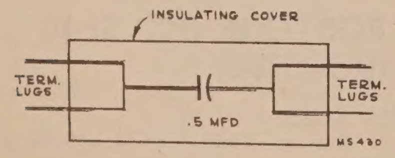


61-9
(Ivory Plastic)

(13) 65BR9 (RC-1045)

Special Note:

Capacitors C16 and C17 are of a special high frequency type. In the event that replacement should be required use only Stock No. 72076. The wiring should be restored to its original position. Failure to observe these precautions may result in additional vibrator hash. The schematic diagram of Stock No. 72076 is illustrated below.


INSULATING COVER
TERM. LUGS
TERM. LUGS
.5 MFD
MS430

SCHEMATIC DIAGRAM
STOCK NO. 72076

(14) RADIOLA R65BR9

Service Data:

Service data on Model 65BR9 applies to this model with the exception that the metal monogram (Stock No. 72978) is not used.

(15) 66ED (RS-126)

Service Data:

The Service Data for Model 66E applies to Model 66ED except as follows:

Hand holes have been added to the cabinet. The grille cloth has no trademark logotype.

(16) 66X1, 66X2 (RC-1038) 66X3, 66X7, 66X8, 66X9 (RC-1038A)

Change in 2nd I.F. Trans.:

In some chassis a substitute 2nd I.F. transformer is used which is stamped 922246-9. The original transformer is stamped 922246-6. The substitute transformer does not have C13 (155 mmf.) and when used in this chassis an external 150 mmf. capacitor is added between terminal "B" of the transformer to a tie point to which R12 (47K) is connected.

This external capacitor should not be used with transformers stamped 922246-6.

Speaker Substitution:

In some chassis a substitute speaker has been used. It is stamped with the number 922279-1.

Addition to Parts List:

Stock No.
39632 Capacitor—Mica, 150 mmf. (C13)

SPEAKER ASSEMBLY 922279-1

70405 Speaker—4" x 6" elliptical PM speaker complete with cone and voice coil.

Change in R-F Trimmer C26:

The trimmer capacitor C26 was originally mounted on a bracket on the side of the chassis and its value was 180-250 mmf. In some chassis where C26 did not have sufficient capacity, an additional ceramic capacitor (82 mmf.) was added in parallel with C26. To permit easier alignment it has been relocated, it is now connected directly to the range switch contacts and the bracket is not used. Later production uses a trimmer (without bracket) having a value of 40-370 mmf.

Change in Parts List:

CHASSIS ASSEMBLIES

Add:
73075 Capacitor—Mica trimmer, 40-370 mmf. (C26).
NOTE: Replaces Stock No. 71121.

(17) 66X11, 66X12, 66X13

Addition to Parts List:

CHASSIS ASSEMBLIES

72601 Plate—Dial back plate complete with drive cord pulleys for 66X12

MISCELLANEOUS

73278	Back—Cabinet back for Model 66X13 —mahogany
71893	Decal—Trade mark decal (2nd prod. only)

(18) 66X12 2nd PROD. (RC-1046D)

Service Data:

Service data on 66X11 2nd Prod. (RC-1046E) applies to this model with the exception of the parts listed below.

CHASSIS ASSEMBLIES
RC-1046D

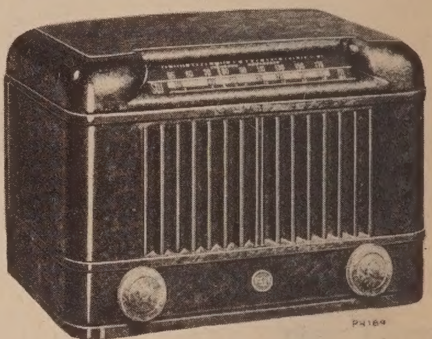
72601 Plate—Dial back plate complete with drive cord pulleys—for 66X12

MISCELLANEOUS
(As listed in 66X12 Service Data)

(19) Q110 (RC-594C)

Service Data:

The Service Data for Model Q10 (1946—X5) applies to Model Q110 except for the cabinet.



Model Q110

(20) CV-112X (RS-111A)

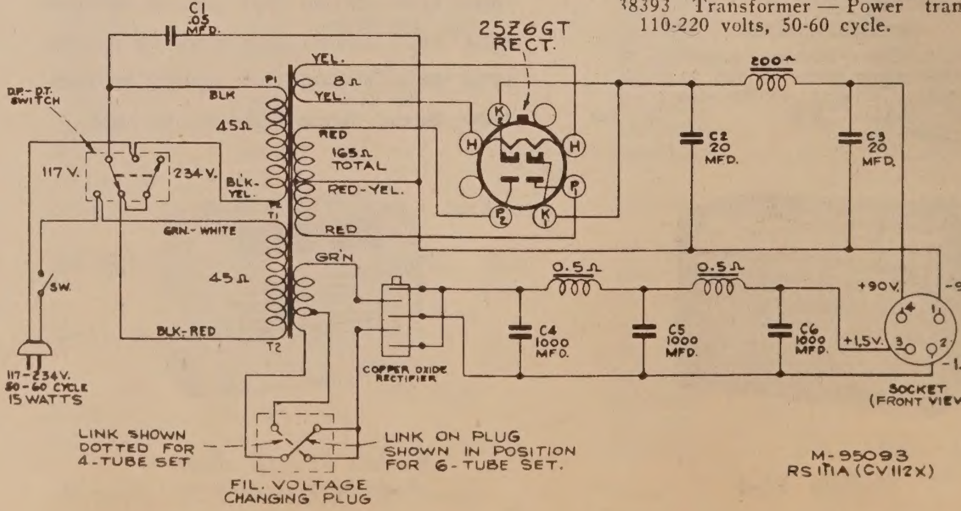
Service Data:

This electrifier may be used to operate Models QB55 or QB55X from a 105/125 v. or 210/250 v. 50 or 60 cycle power supply. The schematic diagram and replacement parts are given below.

Replacement Parts

CV-112X (RS-111A)

4886	Capacitor—.05 mfd.—400 volts (C1).
30873	Capacitor—Electrolytic, 2 sections 20 mfd., 150 volts.
36553	Capacitor—Electrolytic, 1,000 mfd., 3 volts.
36547	Coil—High voltage choke coil—200 ohms.
36548	Coil—Low voltage choke coil—marked 1B84.
36549	Coil—Low voltage choke coil—marked 1B85.
38353	Plug—2-contact filament voltage changing plug.
36551	Rectifier—1.5 volt rectifier.
36552	Socket—4-contact power output socket
18008	Socket—Tube socket.
36550	Switch—Power cord switch.
33491	Switch—Voltage change switch.
38393	Transformer — Power transformer — 110-220 volts, 50-60 cycle.


C1
.05 MFD.
25Z6GT
RECT.
DP.-DT. SWITCH
117 V.
234 V.
P1
BLK
45Ω
BLK-YEL.
T1
GRN.-WHITE
45Ω
BLK-RED
T2
YEL.
8Ω
YEL.
RED
165Ω TOTAL
RED-YEL.
RED
GR'N
K2
H
H
P1
P2
K1
200^
C2 20 MFD.
C3 20 MFD.
0.5Ω
0.5Ω
C4 1000 MFD.
C5 1000 MFD.
C6 1000 MFD.
COPPER OXIDE RECTIFIER
+90V.
-90V.
+1.5V.
-1.5V.
4
1
3
2
SOCKET (FRONT VIEW)
SW.
117-234V. 50-60 CYCLE 15 WATTS
LINK SHOWN DOTTED FOR 4-TUBE SET
LINK ON PLUG SHOWN IN POSITION FOR 6-TUBE SET.
FIL. VOLTAGE CHANGING PLUG
M-95093
RS IIIA (CV112X)

SUPPLEMENTARY DATA (Continued)

DIAL DRIVE AND INDICATOR CORDS

Individual lengths of cords suitable for one chassis are no longer carried in stock, but may be ordered from your distributor by specifying the Stock No. and length desired. The Stock Nos. now available and mentioned below, except Stock No. 72987 (.020″ dia.) which is furnished in 150 ft. spools, are for 250 ft. reels. Cable clamps for use with these cords are available as Stock No. 38201 (100 clamps).

RCA VICTOR MODELS

Model	*Chassis No.*	*Approx. Overall Length†* *Drive Cord*	 *Pointer Cord*
55F	RC-1004E	37 inches	——
55U	RC-1017	47 inches	——
56X, 56X2, 56X3	RC-1011, RC-1011A, RC-1011B	50 inches	——
56X5	RC-1023	50 inches	——
56X10	RC-1023B	50 inches	——
56X11	RC-1023A	50 inches	——
58V	RC-604	44 inches	——
59V1	RC-605A	44 inches	——
64F1, 64F2	RC-1037	39 inches	——
64F3	RC-1037A	41 inches	——
65BR9	RC-1045	17 inches	18 inches
65F	RC-1004E	37 inches	——
65U	RC-1017, RC-1017B	47 inches	——
65U-1	RC-1017A	47 inches	——
65X1, -2, -8, -9	RC-1034, RC-1064	39 inches	——
66BX	RC-1040, RC-1040A, RC-1040B	38 inches	——
66X1, 66X2	RC-1038	52 inches	——
66X3, -4, -7, -8, -9	RC-1038A	52 inches	——
66X11	RC-1046A, RC-1046C	50 inches	——
66X12	RC-1046, RC-1046D	50 inches	——
66X13,	RC-1046B, RC-1046E	50 inches	——
67V1	RC-606B	45 inches	——
68R1, -2, -3, -4	RC-608	67 inches	——
610V1	RC-610C	84 inches	——
610V2	RC-610, RC-610C	84 inches	——
612V1, 612V3, 612V4	RK-121	29 inches	41 inches

Note: Where no pointer cord is listed the dial drive cord also serves as indicator cord. In such cases only one cord is used.

† Includes approx. 2 inches for forming loops at the ends.

For all models listed above (except 612V1, 612V3) use Stock No. 72953 Cord (.028″ dia.); for 612V1, 612V3 use Stock No. 72987 Cord (.023″ dia.).

RADIOLA MODELS

Model	*Chassis No.*	*Approx. Overall Length†* *Drive Cord*	 *Indicator Cord*
61-1, 61-2, 61-3	RC-1011, RC-1011A, RC-1011B	50 inches	——
61-5	RC-1023	50 inches	——
61-6, 61-7	RC-594D	38 inches	——
61-8, 61-9	RC-1034, RC-1064	39 inches	——
61-10	RC-1023B, RC-1023C	50 inches	——
62-1	RC-1017A	47 inches	——
R65BR9	RC-1045	17 inches	18 inches

Note: Where no pointer cord is listed the dial drive cord also serves as indicator cord. In such cases only one cord is used.

† Includes approx. 2 inches for forming loops at the ends.

For all models listed above use Stock No. 72953 Cord (.028″ dia.).

RCA INTERNATIONAL "Q" MODELS

Model	*Chassis No.*	*Approx. Overall Length†* *Drive Cord**	 *Indicator Cord***
Q10 Series	RC-594C	38 inches	——
QB11, QB12	RC-529A	31 inches	55 inches
QB13	RC-612	31 inches	55 inches
Q22A, Q32	RC-507	31 inches	55 inches
Q34	RC-539E	38 inches	74 inches
Q36	RC-585	64 inches	——
QB55	RC-563A	51 inches	——
QB55X	RC-563K	51 inches	——
QU61	RC-568B	27 inches	43 inches
QU72, QU72A	RC-1035	48 inches	——
Q103 Series	RC-1044, RC-1044B	54 inches	——
Q110	RC-594C	38 inches	——
Q121	RC-507, RC-507U	31 inches	55 inches
Q122	RC-601, RC-601D	31 inches	55 inches
Q122X	RC-601A, RC-601E	31 inches	55 inches

Note: Where no pointer cord is listed the dial drive cord also serves as indicator cord. In such cases only one cord is used.

† Includes approx. 2 inches for forming loops at the ends.

* For all models listed above use Stock No. 72953 Cord (.028″ dia.) as DRIVE CORD.

** For all models listed above use Stock No. 72913 Cord (.040″ dia.) as INDICATOR CORD.

POWER SUPPLY RATINGS

Radios and radio-phonographs designed for use outside the United States of America are made for use with various power supplies (3 or 4 may be listed on the instrument label and in the service note).

Where more than one voltage and frequency rating is listed the required power supply is indicated by a rubber stamped letter opposite one of the ratings on the instrument label. Each instrument is initially manufactured for operation on only one of the power supplies listed and is not suitable for use on any other power supply.

Rating A—105-125 volts, 50-60 cycles.

Rating B—105-125 volts, 25-60 cycles.

Rating C—105-125 or 210-250 volts, 50-60 cycles.

Rating D—100-115, 115-135, 135-165, 190-230 or 220-260 volts, 40-60 cycles.

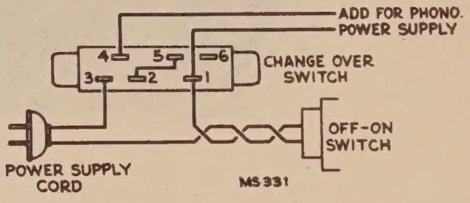
Note: Phonograph motors are usually designed for operation on one frequency only—some may be converted to operate on a different frequency by installing a conversion spring.

110 VOLT A.C. SUPPLY FOR PHONO-MOTORS FROM 220 VOLT A.C. LINE

In many cases it is desired to operate a record player having a 110 volt motor while the available power supply is 220 volts. The 110 volt supply may be readily obtained when the radio receiver with which the record player is used, has a power transformer with two primary windings. An example is that used with Models Q121, Q22A and Q32. They have a change over switch on the back of the chassis to permit switching the transformer primaries from parallel to series for operation on 220 volts. The terminal view and connections of the switch used on these receivers is shown below.

CAUTION:

This method should be used only where the power required by the phono-motor does not exceed 20 watts.



SIMPLIFIED SCHEMATICS

The Service Note (1947—X3) for Models QB-11, QB-12 and QB-13 contains simplified schematic diagrams showing the wave band switch in each of the five positions.

These simplified schematic diagrams also apply to the following models:

Model No.	*Chassis No.*	*Model No.*	*Chassis No.*
QB-1	RC-529A	Q-22	RC-507
QU-2C	RC-507C	Q-22A	RC-507
QU-2M	RC-507D	Q-23	RC-592
QU-3C	RC-507H	QK-23	RC-507B
QU-3M	RC-507F	†Q-24	RC-508
QU-5	RC-530	Q-25	RC-507A
QB-9	RC-529H	Q-26	RC-507J
QB-11	RC-529A	Q-27	RC-507K
Q-16	RC-561	Q-32	RC-507
Q-16E	RC-561C	QU-52C	RC-507L
†Q-17	RC-561A	QU-52M	RC-507N
		Q-121(EM)	RC-507
		Q-121(PM)	RC-507U

† Models Q-17 and Q-24 have an additional capacitor in series with the antenna lead.

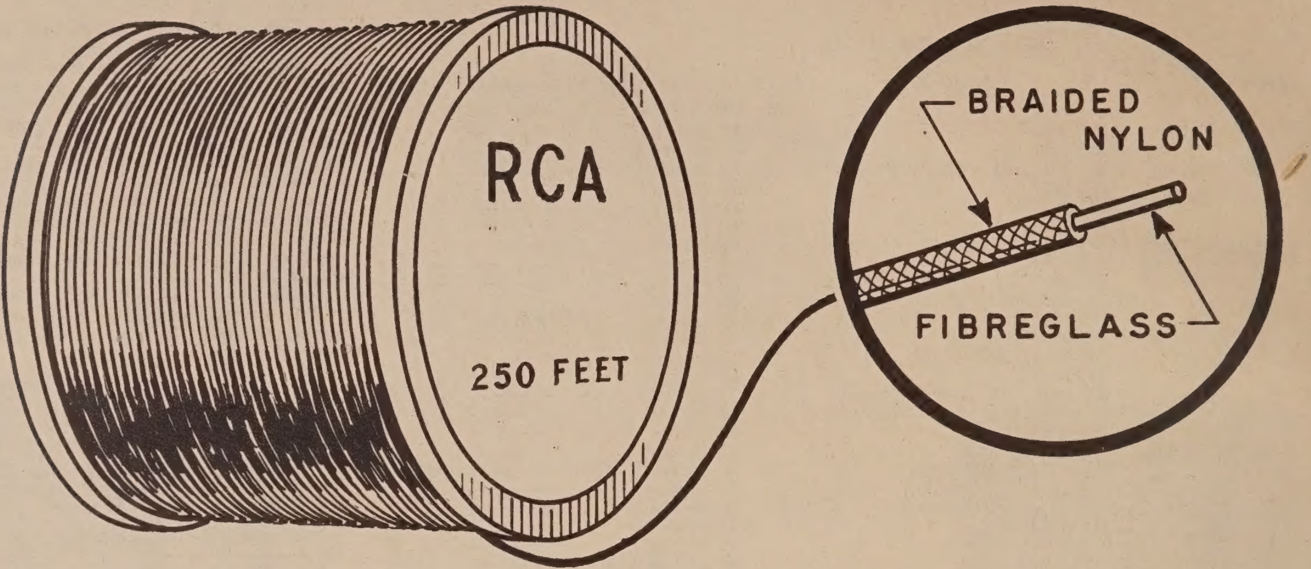
ERROR IN SCHEMATIC DIAGRAMS

The coil designation in the schematic diagrams for the models listed below is in error in the following manner:

Coil L4 is designated as the antenna secondary winding for "31 meter" band. Actually L5 is the antenna secondary winding for "31 meter" band. Remove the 31M designation from L4 and add "31M" to L5.

Coil L5 is designated as the antenna winding for "B" band. Actually L4 and L5 in series is the antenna secondary winding for "B" band. Remove the "B" designation from L4 and add "B" to the common connection between L4 and L5.

Model No.	*Chassis No.*	*Model No.*	*Chassis No.*
QB-1	RC-529A	Q-17	RC-561A
QB-2	RC-529	Q-22	RC-507
QU-2C	RC-507C	Q-22A	RC-507
QU-2M	RC-507D	Q-23	RC-592
QU-3C	RC-507H	QK-23	RC-507B
QU-3M	RC-507F	Q-24	RC-508
QU-5	RC-530	Q-25	RC-507A
QB-6	RC-529D	Q-26	RC-507J
QB-9	RC-529H	Q-27	RC-507K
QB-11	RC-529A	Q-32	RC-507
Q-16	RC-561	QU-52C	RC-507L
Q-16E	RC-561C	QU-52M	RC-507N
		Q-121(EM)	RC-507
		Q-121(PM)	RC-507U



RCA DIAL DRIVE CORD

NF-28 ● NF-40

Features

- WILL NOT STRETCH
- NOT AFFECTED BY MOISTURE
- HIGH TENSILE STRENGTH
- EXTREMELY FLEXIBLE
- CLOSELY BRAIDED TO INSURE LONG WEAR

This dial drive cord is made from the finest black nylon braided over a special fibreglass core. Dial belts made from this cord cannot stretch and cause troublesome slipping. Even high humidity will not affect it. This dial drive cord is available in two handy sizes: (1) NF-28 with a diameter of .028 inch and (2) NF-40 with a diameter of .040 inch. These two types supersede most old-style cords.

Stock no. 72953 — Dial drive cord NF-28, 250-foot spool.
Stock no. 72913 — Dial drive cord NF-40, 250-foot spool.

ALL-NYLON DIAL CORD AN-20

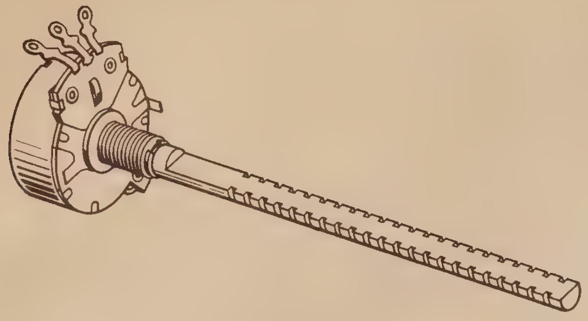
AN-20 is a closely-braided all-nylon cord approximately .023 inch in diameter. Strong, durable, popular for replacement purposes. Does not have all the features of the NF-28 cord, but will give long dependable service.

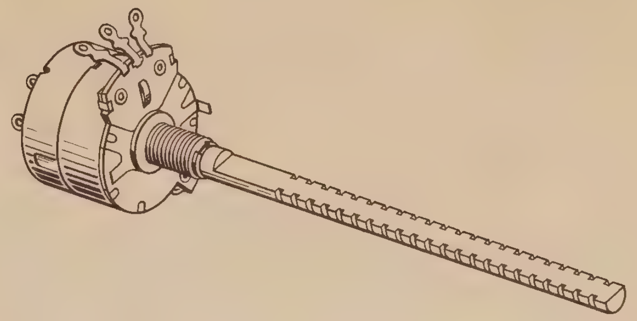
Stock no. 72987—Dial drive cord AN-20, 150-foot spool.

RCA DIAL BELT CLAMPS

These clamps are split rivets designed for fastening together the two ends of a dial drive cord. Use them with cords NF-28, NF-40, and AN-20 when making your own dial belts.

Stock no. 38201—100 dial belt clamps.





UNIVERSAL VOLUME CONTROLS

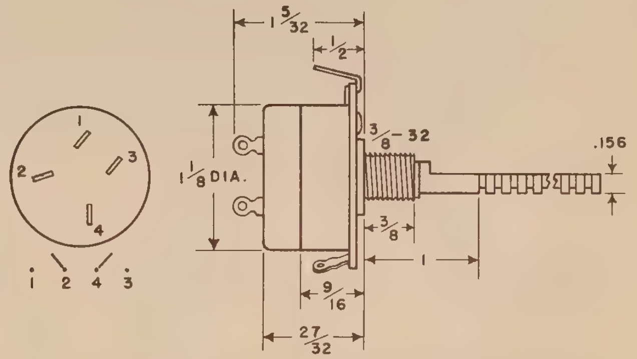
Notches on shaft facilitate cutting to required length

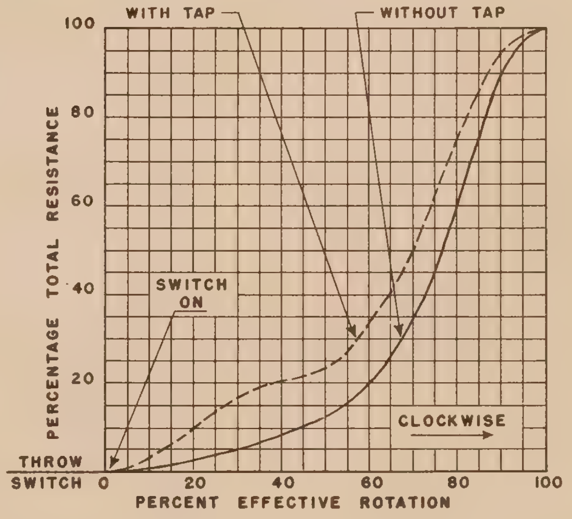
- **SMOOTH QUIET OPERATION**
- **SMALL SIZE; COMPACT**
- **LONG-LIFE COMPOSITION ELEMENTS**
- **FULLY SHIELDED**

These potentiometers are ideal for use as volume or tone controls and are well suited for applications in cathode-ray-tube circuits.

Notches every ⅛ inch along the universal shaft permit easy cutting to the required length. Simply file a small groove at the desired notch, and break off the unwanted length. Shaft with standard flat accommodates either spring-type push-on or set-screw knobs.

These controls are available with tone taps, with DPST switches, and in resistance values to meet the requirements of most present-day radios.



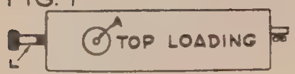


STOCK NO.	RESISTANCE (OHMS)	TAP (OHMS)	SWITCH
38409	500 M	no tap	no switch
38410	500 M	no tap	DPST
38411	500 M	100 M	no switch
38412	500 M	100 M	DPST
38405	1 meg.	no tap	no switch
38406	1 meg.	no tap	DPST
38407	1 meg.	200 M	no switch
38408	1 meg.	200 M	DPST
38401	2 meg.	no tap	no switch
38402	2 meg.	no tap	DPST
38403	2 meg.	400 M	no switch
38404	2 meg.	400 M	DPST

CRYSTAL PICKUP DATA

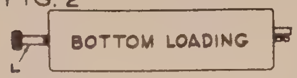
CRYSTAL CARTRIDGES

FIG. 1


TOP LOADING
L

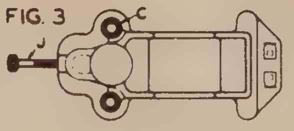
RCA 14820

FIG. 2


BOTTOM LOADING
L

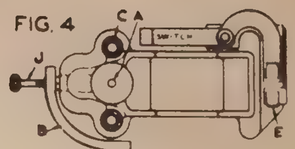
RCA 30708 SUPERSEDED BY RCA 14820, FIG. 1.

FIG. 3



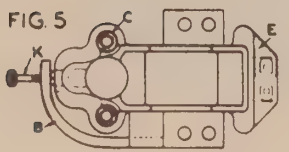
RCA 31050

FIG. 4


CA
SWITCH
J
B
E

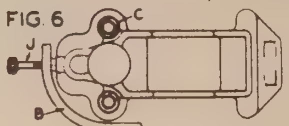
RCA 31156
RCA 32632 SUPERSEDED BY RCA 31156

FIG. 5



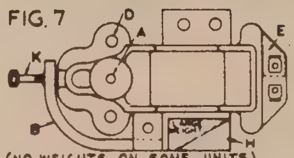
RCA 33122

FIG. 6



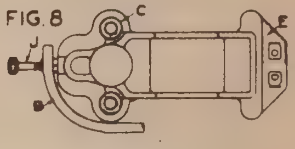
RCA 33217

FIG. 7


D
A
K
E
B
LARGE WEIGHT
H

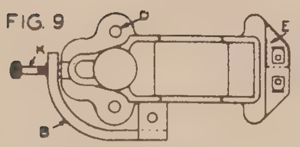
(NO WEIGHTS ON SOME UNITS)
RCA 33905 } SUPERSEDED BY
RCA 35171 } RCA 37158, FIG. 11

FIG. 8



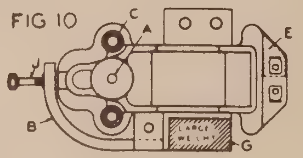
RCA 34225

FIG. 9



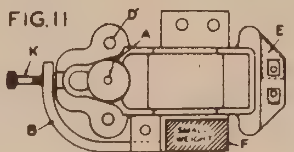
RCA 34307

FIG 10


C
A
E
J
B
LARGE WEIGHT
G

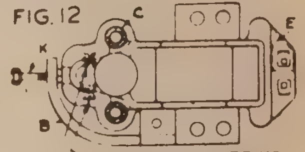
RCA 34710

FIG. 11


D
A
K
E
B
SMALL WEIGHT
F

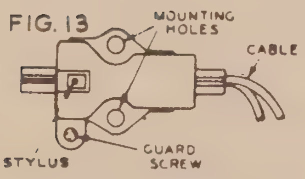
RCA 37158

FIG. 12



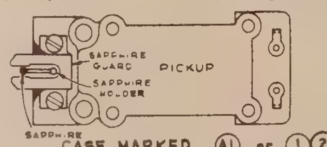
ARM STOP SCREWS
RCA 39686

FIG. 13


MOUNTING HOLES
CABLE
STYLUS
GUARD SCREW

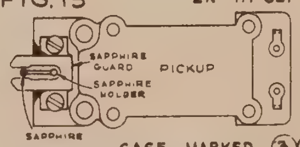
RCA 38610 USES SAPPHIRE STYLUS 39564.

FIG. 14 AL = 0.5 OZ.


SAPPHIRE GUARD
PICKUP
SAPPHIRE HOLDER
SAPPHIRE

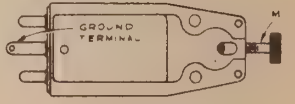
CASE MARKED Ⓐ or ① ②
RCA 70338 USES SAPPHIRE STYLUS 72345.
RCA 70339 USES SAPPHIRE STYLUS 70915.

FIG. 15 ZN = 1.1 OZ.


SAPPHIRE GUARD
PICKUP
SAPPHIRE HOLDER
SAPPHIRE

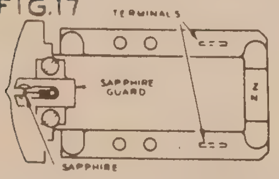
CASE MARKED ③ ④
RCA 72551 USES SAPPHIRE STYLUS 38449.

FIG. 16


GROUND TERMINAL
M

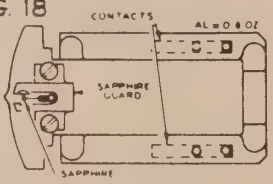
RCA 71173 (CAN BE REPLACED BY RCA 70338 FIG. 14, WHEN ADAPTER PLATE 72898 IS USED.

FIG. 17


TERMINALS
SAPPHIRE GUARD
ZN
SAPPHIRE

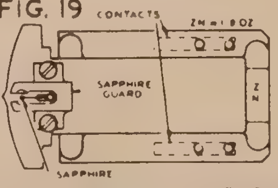
RCA 9890 (MAGIC TONE CELL) USES SAPPHIRE STYLUS 39863

FIG. 18


CONTACTS
AL = 0.6 OZ
SAPPHIRE GUARD
SAPPHIRE

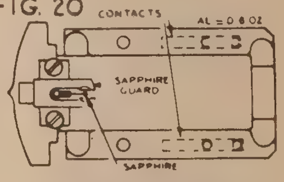
RCA 39919 USES SAPPHIRE STYLUS 38449

FIG. 19


CONTACTS
ZN = 1.9 OZ
SAPPHIRE GUARD
ZN
SAPPHIRE

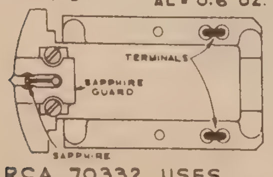
RCA 39550 SUPERSEDED BY RCA 39919, FIG. 18. SEE NOTE BELOW

FIG. 20


CONTACTS
AL = 0.6 OZ
SAPPHIRE GUARD
SAPPHIRE

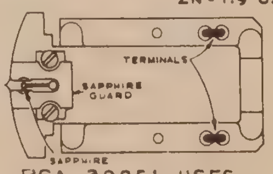
RCA 38598 USES SAPPHIRE STYLUS 38449

FIG. 21 AL = 0.6 OZ.

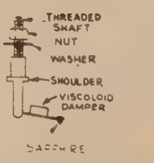

TERMINALS
SAPPHIRE GUARD
SAPPHIRE

RCA 70332 USES SAPPHIRE STYLUS 38449

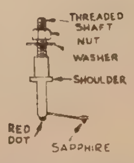
FIG. 22 ZN = 1.9 OZ.


TERMINALS
SAPPHIRE GUARD
SAPPHIRE

RCA 39851 USES SAPPHIRE STYLUS 39863.


THREADED SHAFT
NUT
WASHER
SHOULDER
VISCOLOID DAMPER
SAPPHIRE

STANDARD OUTPUT STYLUS 38449 HAS FLAT ON SHAFT. 70915 HAS ROUND SHAFT.


THREADED SHAFT
NUT
WASHER
SHOULDER
RED DOT
SAPPHIRE

HIGH-OUTPUT STYLUS 39863 HAS FLAT ON SHAFT. 72345 HAS ROUND SHAFT.

DRAWING CODE

"A"	Top Needle Hole
"B"	Viscoloid Damper
"C"	Thick (5/16-in.) Mtg. Hole
"D"	Thin (7/32-in.) Mtg. Hole
"E"	Grounded Lug
"F"	Small Weight
"G"	Large Weight
"H"	Large "Cut" Weight
"J"	Needle Screw 31160
"K"	Needle Screw 33974
"L"	Needle Screw 14822
"M"	Needle Screw 71174

NOTE: CORRECT TENSION SPRING FOR ALUMINUM TONE ARM IS RCA 30685. FOR ZINC TONE ARM IS RCA 39673.

CRYSTAL PICKUP DATA

REFERENCE INDEX BY EQUIPMENT MODEL NUMBERS

(Automatic Record Changer Type Nos. in Parenthesis)

Model Number	*Crystal Stk. No.*	*Cartridge Fig. No.*
QU2-C	37158	11
QU3-C	37158	11
QU5 (RP-145E)	37158	11
6J, 6JM	70338	14
6QU	33122	5
8QU5-C	34307	9
U-8	33122	5
U-9	33122	5
U-10	33122	5
11-QU (RP-132A)	31156	4
12-QU (RP-132A)	31156	4
U-12	37158	11
VA-15 (RP-152)	37158	11
U-20	37158	11
VA-20	31050	3
VA-21	33122	5
VA-22 RP-139D)	31156	4
VA-24 (RP-145)	37158	11
U-25 (RP-132M)	31156	4
U-26 (RP-132M)	31156	4
U-30 (RP-132M)	31156	4
U-40 (RP-139A)	37158	11
U-42 (RP-145)	37158	11
U-43 (RP-145)	37158	11
U-44 (RP-145)	37158	11
U-45 (RP-139A)	37158	11
U-46 (RP-140)	37158	11
O-50	33217	6
U-50	33217	6
QU-51C (RP-145E)	37158	11
QU-52C (RP-152S)	37158	11
55U, 55AU (960015)	71173*	16
QU-56C	33122	5
R-56	39686	12
58V, 58AV (960001-1).	39851	22
59V1, 59AV1 (960001-2)	70332	21
R-60	33122	5
QU-61 (960001-4)	39851	22

Model Number	*Cartridge Fig. No.*	*Crystal Stk. No.*
QU-62 (960001-4)	39851	22
Rad. 62-1 (960260-2)	70338	14
63E, 63EM	70338	14
65U, 65AU, 65U-1 (960260-2, -4)	70338	14
66E, 66E1	70332	21
67V1, 67AV1 (960260-1)	70338	14
QU-72, QU-72A	39851	22
R-89	31050	3
R-91	31050	3
R-93-B, R-93-C	31050	3
R-93-F	33122	5
R-94-B	31050	3
R-98	31156	4
R-100	33122	5
V-100	33122	5
V-101	33122	5
V-102	37158	11
R-103S	33122	5
U-104	31050	3
V-105	33122	5
U-106 (RP-129B)	14820	1
U-107 (RP-129A)	14820	1
U-108 (RP-129)	14820	1
U-109 (RP-129)	14820	1
U-111	31050	3
U-112	31050	3
U-115	31050	3
U-119	31156	4
U-121	31050	3
U-122E	31156	4
UY-122E	31156	4
U-123 (RP-139B)	31156	4
U-124	31156	4
UY-124	31156	4
U-125 (RP-132C)	31156	4
U-126	31156	4
U-127E	31050	3

Model Number	*Crystal Stk. No.*	*Cartridge Fig. No.*
U-128 (RP-132)	31156	4
U-129 (RP-132C, F)	31156	4
U-130 (RP-132C)	31156	4
U-132 (RP-132B)	31156	4
U-134, U-134A (RP-132B)	31156	4
V-135 (RP-162)	38610	13
V-140 (RP-162)	38610	13
V-170 (RP-152)	37158	11
V-175 (RP-158)	38610	13
V-200 (RP-152A)	37158	11
V-201 (RP-152A)	37158	11
VHR-202 (RP-155)	37158	11
V-205 (RP-152B)	37158	11
V-205A (RP-153)	37158	11
VHR-207 (RP-155)	37158	11
V-209 (RP-158)	38610	13
V-210 (RP-158)	38610	13
VHR-212 (RP-161)	38610	13
V-215 (RP-160)	39919	18
V-219 (RP-160A)	39919	18
V-221 (RP-160B)	39919	18
V-225 (RP-151) Top	39919	18
Bottom	38598	20
V-300 (RP-152J)	37158	11
V-301 (RP-153)	37158	11
V-302 (RP-153)	37158	11
VHR-307 (RP-155)	37158	11
V-405 (RP-152J)	37158	11
VHR-407 (RP-155)	37158	11
Rad. 560P	33122	5
Rad. 566P (RP-162)	38610	13
610V1, 610V2 (960001-5, -6)	39851	22
612V1, 612V3 (RP-176)	70339	14
641TV (960001-1, -6)	39851	22
711V2 (960001-1, -5)	39851	22

Stock number 9890 Phonograph Modernization Kit (magic tone cell) may be used as a replacement in any model using cartridges shown in figures 3, 5, 6, 8, 9, 10, 12, 18, 19, 21, and 22. When RCA 9890 is used as a replacement for needle-type pickups it may be necessary to modify the phonograph input circuit for best tone and volume. Complete instructions are included with the crystal.

* RCA 71173 can be replaced by 70338, figure 14, when Adaptor Plate RCA 72898 is used. This plate is not included with the crystal.

REFERENCE INDEX BY CRYSTAL STOCK NUMBERS

Crystal Stk. No.	*Cartridge Fig. No.*	*Equipment Model Number*
9890	17	Phonograph Modernization Kit (magic tone cell) may be used as replacement in any model using cartridges shown in figures 3, 5, 6, 8, 9, 10, 12, 18, 19, 21 and 22. Ten RCA 9890 crystals in a dealer's display carton comprises one Type 203X1.
14820	1	U-106, U-107, U-108, U-109.
30708	2	(Superseded by 14820).
31050	3	VA-20, R-89, R-91, R-93-B, R-93-C, R-94-B, U-104, U-111, U-112, U-115, U-121, U-127E.
31156	4	11-QU, 12-QU, VA-22, U-25, U-26, U-30, R-98, U-119, U-122E, UY-122E, U-123, U-124, UY-124, U125, U-126, U-128, U-129, U-130, U-132, U-134 U-134A.
32632	4	(Superseded by 31156).
33122	5	6QU, U-8, U-9, U-10, VA-21, QU-56-C, R-60, R-93-F, R-100, V-100, V-101, R-103S V-105, Rad. 560P.
33217	6	O-50, U-50.
33905	7	(Superseded by 37158).
34307	9	8QU5-C.
35171	7	(Superseded by 37158).
37158	11	QU2-C, QU3-C, QU5, U-12, VA-15, U-20, VA-22, VA-24, U-40, U-42, U-43, U-44, U-45, U-46, QU-51C, QU-52C, V-102, V-170, V-200, V-201, VHR-202, V-205, V-205A, VHR-207, V-300, V-301, V-302, VHR-307, V-405, VHR-407.
38453	18	(Superseded by 39919).
38598	20	V-225 (bottom RP-151).
38610	13	V-140, V-175, V-209, V-210, VHR-212, Rad. 566P.
39550	19	(Superseded by 39919).
39686	12	R-56.
39851	22	58V, 58AV, QU-61, QU-62, QU-72, QU-72A, 610V1, 610V2, 641TV, 711V2.
39919	18	V-215, V-219, V-221, V-225 (top RP-151).
70332	21	59V1, 59AV1, 66E, 66E1.
70338	14	6J, 6JM, Rad. 62-1, 63E, 63EM, 65U, 65AU, 65U-1, 67V1, 67AV1.
70339	14	612V1, 612V3.
71173	16	55U, 55AU (can be replaced by 70338 when adaptor plate RCA 72898 is used).

CRYSTAL PICKUP DATA

RCA PHONOGRAPH MODERNIZATION ASSEMBLIES

MAGIC TONE CELL RCA 9890

Ten Magic Tone Cells, packaged in a self-selling counter merchandiser, comprises one type 203X1. The Magic Tone Cell may be used as a replacement for the following RCA Crystals:

Crystal Stk. No.	*Cartridge Fig. No.*	*Crystal Stk. No.*	*Cartridge Fig. No.*
31050	3	39686	12
33122	5	39919	18
33217	6	39550	19
34225	8	39851	22
34307	9	70332	21
34710	10		

Complete instructions are included with the crystal.

RCA 9890 replaces crystals in the following RCA Victor radio-phonographs and record players (1938 and later), as well as similar crystals in many other makes of phonographs and record players:

QU2-C
QU3-C
QU5
6QU
8QU5-C
U-8
U-9
U-10
U-12
VA-15
U-20
VA-20
VA-21
VA-22
VA-24
U-40
U-42
U-43
U-44
U-45
U-46
O-50
U-50
QU-51C
QU-52C
QU-56C
R-56
58AV
58AV1
59V
59V1
R-60
QU-61
R-89
R-91
R-93-B
R-93-C
R-93-F
R-94-B
R-100
V-100
V-101
V-102
R-103S
U-104
U-105
U-111
U-112
U-115
U-121
U-127E
V-170
V-200
V-201
VHR-202
V-205
V-205A
VHR-207
V-215
V-219
V-221
V-225
V-300
V-301
V-302
VHR-307
V-405
VHR-407
Rad. 560P

SILENT SAPPHIRE CRYSTAL AND MOUNTING RCA 70338A

Twelve Silent Sapphire Crystals and Mountings packaged in a self-selling counter merchandiser comprises one type 208X1. The Silent Sapphire Crystal and Mounting may be used to replace the following crystals in equipment having tone arms of sufficient width:

ASTATIC	L-22A, L-24A, L-25A, L-26A, L-27A, L-32A, L-36A, L-40A, L-41A, L-50A, L-70, L-70A, L-70S, L-70AS, L-71, L-71A, L-71S, L-71AS, L-75, L-75A, L-75S, L-75AS, L-76, L-76A, L-76S, L-76AS
CROSLEY	132738
GENERAL INSTRUMENTS	63-70590, 63-70603, 63-70758
MAGNAVOX	560023
OAK	4242-1, 4242-4, 4242-8, 4242-9
RCA	71173
RADIO WIRE TEL. CO.	523, 529
SEEBURG	J-22202, J-22252, B-27099, C-29190, C-29191
SHURE BROS.	W40A, W41A, W42A, W58A, W59A, P-87S, P-88S, P-90S, P-92B, P-93S, P-94, 99-180, 99-181, 99-182
SPARKS WITHINGTON	A20326-3
STEWART WARNER	501366, 501433
WEBSTER CHICAGO	21AO74
WEBSTER ELECTRIC	N-2, N-3, E-4, N-4, E-9
WELLS GARDNER	28A25

RCA VICTOR

VICTROLA 5H

Portable Hand-Wound Phonograph

SERVICE DATA

—1945 No. 9—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Cabinet Dimensions

Height	7	inches
Width	16⅜	inches
Depth	13½	inches

Motor.—The drive motor is of simple design and substantial construction. It should require little or no service if properly maintained. Attention to lubrication of the moving parts and occasional cleaning of the mechanism will go far to prevent faulty operation. Should it become necessary to repair the motor, the following procedure should be applied: **CAUTION.—Allow the motor mechanism to run down completely before attempting adjustment, repairs, or replacements.**

Removing Motor from Cabinet.—Remove the winding crank. Remove the seven wood screws holding the motor board in the cabinet and the two wood screws holding the cabinet lid support. To dismount the motor, unscrew the spindle cap and remove turntable, slightly tapping the spindle while exerting an upward lift on the turntable. Loosen the screw holding the speed-regulating lever and remove the latter. The three screws holding motor to motor board should then be removed.

Replacing Main Spring Barrel.—In case of main spring failure, the entire spring barrel and gear should be replaced. Remove the spring-barrel spindle screw by **unscrewing to right.** Remove the C washer and two pillar screws holding bottom plate. Remove bottom plate, intermediate spindle shaft, and spring barrel. Reassemble parts in reverse sequence.

Winding Shaft Spring.—This spring functions as a friction ratchet. It may be removed as follows: remove pin holding winding worm on shaft; remove winding shaft; then remove screw holding spring. Replace in reverse sequence.

Speed Regulator Lever.—After assembly, adjust the speed regulator until the turntable rotates at 78 r.p.m.; loosen the speed regulator screw and set pointer to center of speed indicator scale; tighten screw and recheck turntable speed.

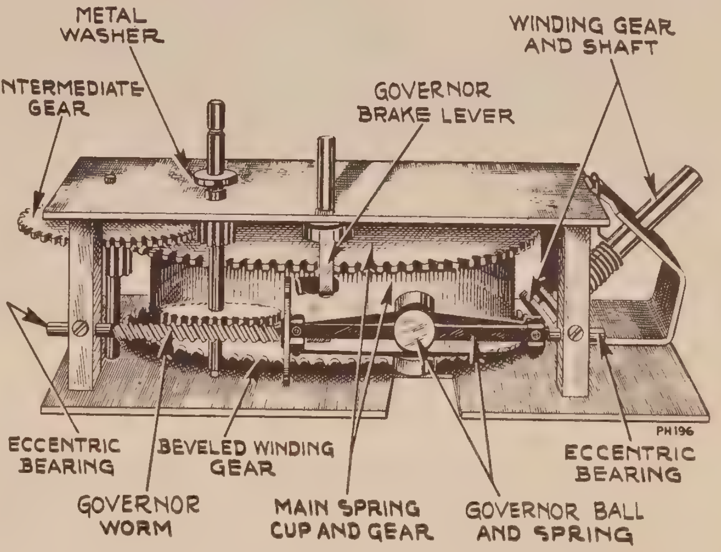
Lubrication.—All moving parts of the motor should be thoroughly cleaned and lubricated every six months to prevent excess wear and to assure proper operation. A small amount of grease should be applied to the worm gear of the governor, the gear of the winding shaft, and on the small pinion gear. All other points, including regulator friction pad, should be lubricated with light oil. All motor parts should be covered with a light film of oil to prevent rusting.

Motor Adjustments:

Speed variations or WOWS may be experienced with these instruments due to a variety of causes. Some of the troubles and corrections are listed below:

1. A regular WOW occurring on every revolution of the turntable, or every few revolutions.

(a) A frequent cause of this difficulty is faulty adjustment of the governor springs. If the governor weights seem to oscillate in and out when the motor is in operation, the spring tension of the three weights may not be evenly balanced. Loosen the spring clamping screws and position the springs so that all three weights are held with the same tension.



(b) Another possible cause of this trouble is faulty adjustment of the governor bearings. To adjust these bearings:

First: Set the speed regulator lever so that the face of the felt friction pad is accurately parallel to the governor friction plate.

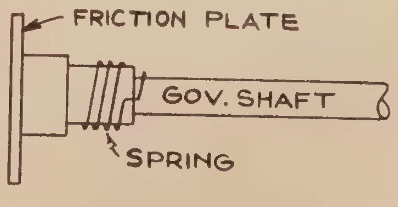
Second: Loosen both governor bearing set screws and position the governor so that the motor revolves at rated speed (78.4 rpm).

Third: Adjust the mesh of the worm and the fiber drive gear by turning the eccentric bearings. These should be set so that the worm meshes properly with the fiber gear without binding.

Fourth: Adjust the distance between bearings so that the governor turns freely with a minimum of end-play.

(c) A take-up spring is mounted on the governor friction plate shaft to ensure against lost motion and erratic operation of this plate. It is essential that this spring be in place and adjusted to provide adequate tension. It should be positioned as indicated in the sketch below.

(d) Marred or broken teeth on either gear on the turntable shaft or on the intermediate gear shaft may cause this trouble. If inspection shows this to be the case, the defective gear should be replaced.



Correct Position of Take-up Spring

2. The turntable loses speed or WOWS on the louder parts of a record:

(a) This may be caused by failure of the governor to respond accurately to speed changes, due to excessive or irregular friction between the sliding friction plate and the governor shaft. When this occurs it may be corrected by removing the weights and working the plate back and forth until it frees up. If the governor shaft does not have a smooth surface it may be necessary to smooth it down slightly using "Crocus Cloth" or to replace the governor.

(b) This condition may also be caused by excessive friction in any part of the motor. Be sure that the governor bearings are properly adjusted as described in section 1 (b). Lubricate all bearings in the motor using a high grade light oil such as RCA Stock No. 7227 Spring Motor Oil. The governor shaft, friction plate, and felt friction pad should also be lubricated with this oil. Lubricate the worm with a light grease such as RCA Stock No. 10975 Electric Motor Grease. Remove the main spring and pack it with a graphite lubricant such as RCA Stock No. 7228.

3. The turntable speed changes erratically over long periods of time.

(a) This may be caused by binding of the main spring due to improper lubrication. To correct this condition pack the spring with graphite grease as described in section 2 (b).

(b) Make sure that the top of the main spring housing does not rub on the end of the winding shaft.

(c) Inspect the gear teeth on the main spring gear. If these are marred or broken, it may be necessary to replace the spring assembly.

Replacement Parts

STOCK No.	DESCRIPTION
	MOTOR ASSEMBLIES
33373	Bearing—One set governor shaft bearings
33366	Gear—Intermediate drive gear and shaft
36570	Gear—Winding worm gear—located on winding key shaft—For angle wind motor
36571	Gear—Winding gear—located on spring barrel shaft—For angle wind motor
13857	Governor—Governor assembly complete
36572	Motor—Angle wind spring motor—Complete with turntable
13865	Screw—Needle holding screw
36573	Shaft—Winding key shaft and socket—less winding gear
72491	Spindle—Turntable spindle and drive gear
13835	Spring—Main spring, spring barrel and drive gear
13862	Weight—Governor weight and spring
	MISCELLANEOUS ASSEMBLIES
33691	Arm—Tone arm—less neck, base, washer, ring, screw and lockwasher
33682	Brake—Turntable brake
33678	Cover—Needle cup cover
33680	Cup—Needle cup
33681	Escutcheon—Speed lever escutcheon
36574	Foot—Cabinet foot (glide)
36575	Handle—Carrying handle (black)
36576	Handle—Carrying handle (brown)
36577	Hinge—Cabinet lid hinge
36578	Key—Winding key
33679	Lever—Speed indicator lever
33687	Mounting—Motor mounting assembly
33692	Neck—Tone arm neck
33690	Screw—Screw and lockwasher to fasten neck on tone arm
30368	Sound box
13851	Spring—Turntable brake spring
34388	Spring—Winding shaft spring
33694	Support—Cabinet lid support
33684	Support—Sound box support
33689	Support—Taper tube support
72138	Turntable—Turntable assembly (brown cover)
33688	Washer—Tone arm bearing washer and retaining snap ring

APPLY TO YOUR RCA VICTOR DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

Phonograph Attachment

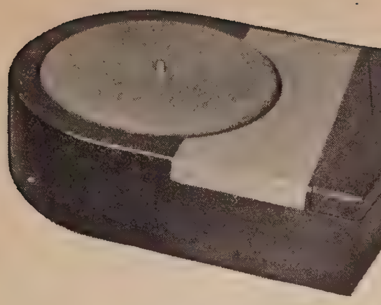
Model 6J, 6JM

Mfr. No. 274

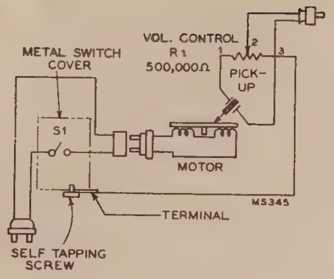
SERVICE DATA

1946..No. 8

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



6J, 6JM



Schematic

Specifications

Power Supply Ratings

6J	105-125 volts, 60 cycles A.C.
6JM	105-125 volts, 50 cycles A.C.
Pickup	Crystal (Low noise, High voltage, sapphire point)
Motor	Self starting, Induction
Drive	Rim Drive 78 RPM

Motor:

The bearings of the motors furnished in these instruments are lubricated at the factory and should require no further lubrication for a period of at least one year. When lubrication is required, apply a few drops of any good grade of S.A.E. No. 10 oil to the bearing felts.

Turntable Spindle:

When lubrication is required apply one or two drops of Gargoyle 600W to the bearing.

Drive Wheel:

Apply one or two drops of any good grade of S.A.E. No. 10 oil to the bearing felt.

Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.

Motor Board Disassembly:

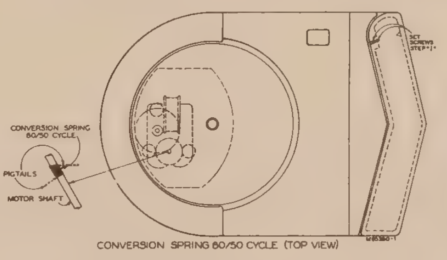
a. Remove the "C" washer on turntable spindle.
b. Lift turntable straight up.
c. Disconnect motor plug from power plug.
d. Remove two screws exposed on top of cabinet.

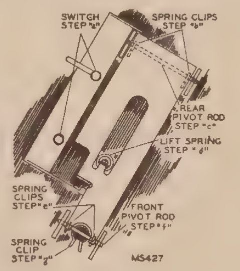
To remove turntable spindle disengage the spring clip from the bottom of the turntable spindle and lift up on the spindle.

To remove the motor from the motor mounting board, remove the three nuts from the top of the motor mounting board.

Disassembly of Pick-up Arm and Components:

a. Remove the switch by removing the two screws holding the switch assembly to the pickup assembly.
b. Remove the spring clips from the rear pivot of the support arm.
c. Remove the rear pivot rod.
d. Disengage the tone arm lift spring from the support arm.
e. Remove the spring clips from the front pivot of the support arm.
f. Remove the front pivot rod.
g. Remove the spring clip from the pick-up pivot arm.
h. Pick-up and bearing are free to be removed when the two leads from the crystal are removed.
i. Pick-up arm can be removed from bearing by loosening the two set screws at the side and bottom on the rear of the pick-up arm.


SET SCREWS STEP "i"
CONVERSION SPRING 60/50 CYCLE
PIGTAILS
MOTOR SHAFT
CONVERSION SPRING 60/50 CYCLE (TOP VIEW)



On 6J and 6JM instruments having motors stamped 970470-1, it is possible to convert these instruments to 117 volt 50 cycle operation. A conversion spring, stock number 72689, is placed over the motor shaft, as shown in the illustration, increasing the diameter of the shaft, and compensating for the decreased motor speed at 50 cycles. These springs may be supplied with pigtails to aid in installation. After the spring has been placed on the shaft, clip the pigtails so they do not interfere with the drive wheel.

Replacement Parts

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
71994	Arm—Pickup arm shell only less pivot arm, cable and crystal
71995	Arm—Pivot arm and shaft
71996	Bracket—Bracket mounted on inside of pickup arm for hold down latch
71278	Cable—Pickup lead cable, twisted pair
70338	Crystal—Crystal cartridge complete
38452	Guard—Sapphire guard
70341	Nut—Nut and washer to mount sapphire and holder
71095	Nut—Speed nut to fasten cable in arm (located in center of arm)
38458	Nut—Speed nut to fasten cable in arm (located in rear of arm)
71997	Screw—Mounting screws to fasten pickup arm and pivot arm (1 set)
37763	Screw—No. 2—56 x ⅛" screw to mount sapphire guard
72345	Sapphire—Sapphire and holder
	TURNTABLE AND MOTOR DRIVE ASSEMBLIES STAMPED 970464-1 FOR 6J ONLY†
30870	Connector—2 prong male plug for motor cable
72780	Spindle—Turntable spindle for motor assembly stamped 970464-1
72779	Spring—Idler wheel tension spring for motor assembly stamped 970464-1
72777	Turntable—Finished turntable plate only for motor assembly stamped 970464-1
35969	Washer—"C" washer to fasten turntable for motor assembly stamped 970464-1
72778	Wheel—Idler wheel for motor assembly stamped 970464-1
	†Identification number may be stamped on laminations

STOCK No.	DESCRIPTION
	STAMPED 970470-1 FOR 6J AND 6JM
30870	Connector—2 prong male plug for motor cable
72781	Motor—117 volt, 60 cycle motor complete with turntable and drive mechanism
39528	Spindle—Turntable spindle for motor assembly stamped 970470-1
72689	Spring—Conversion spring (60 to 50 cycle) for motor and turntable assembly No. 970470-1
39534	Spring—Idler wheel tension spring for motor stamped 970470-1
72782	Turntable—Finished turntable plate only for motor assembly stamped 970470-1
72688	Washer—"C" washer to fasten turntable for motor assembly stamped 970470-1
39529	Wheel—Idler wheel for motor assembly stamped 970470-1
	MISCELLANEOUS
72002	Bearing—Bearing and bracket for mounting pickup arm pivot
71999	Bottom—Case bottom only less rubber feet
Y1376	Cabinet—Plastic cabinet for Model 6J or 6JM
39386	Cable—Shielded pickup cable complete with pin plug
30868	Connector—2 contact female plug for power cable
72000	Control—Volume control (R1)
37831	Fastener—Push fastener for case bottom (1 set)
31051	Feet—Rubber feet (3 required)
71998	Knob—Volume control knob
72004	Latch—Pickup arm hold down latch
72008	Retainer—Pickup and arm assembly mounting retainer
30340	Retainer—Pivot rods' retainer
72003	Rod—Pivot rod to secure bearing and bracket
72005	Rod—Pivot rod for hold down latch
72006	Rod—Pivot rod for main support
30900	Spring—Retaining spring for knob
72007	Spring—Latch spring
72542	Spring—Actuating spring for hold down support and latch assembly
72001	Stop—Rubber stop mounted on pivot arm bearing and bracket
72009	Switch—Power switch (S1)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Connecting Phonograph Attachment to Radio Receivers

Methods of connecting the Phonograph Attachment to various types of audio systems are given in the accompanying text and illustrations. The data given requires that an RCA Stock No. 240 Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "phono" lead to the Stock No. 240 switch, the male plug on the end of the lead matches the female connector on the switch.

In general, the Phonograph Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Phonograph Attachment should be connected to the input of the first audio tube, and at the same time the output of the radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Phonograph Attachment is in operation.

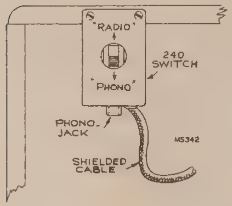
RCA RADIOS WITH PHONO JACK

Plug male connector on the end of the "Phono" lead into the female connector on the receiver chassis. If set is provided with a phono switch, push or turn the "Phono" switch to "Phono" position, and operate the Phonograph Attachment according to instructions. If no switch is provided, use maximum setting of volume control on attachment, and minimum setting of radio volume control which will give acceptable volume, and tune receiver off frequency from any very strong station. In some instances the radio volume control will have the effect of a tone control.

INSTALLATION OF SWITCH

Fasten the bracket to the cabinet in such a position that the switch may be easily reached. For wooden cabinets, a suggested place is the upper rear edge of the cabinet. If the radio has a plastic cabinet, the bracket may be fastened to the chassis by self-tapping screws or soldering. **In the case of AC-DC sets, the bracket should not be fastened to the chassis.** In such cases, a wooden block may be fastened to the chassis and the bracket screwed to the wooden block, care being exercised that there is no metallic path from the bracket to the chassis.

When connecting the switch to sets that operate on both AC and DC, it is necessary to isolate the cable shield from the chassis. This is best done by connecting the shield to the chassis through a .25 mfd 300-volt condenser. Care should be taken that the shield braiding and switch bracket do not come in contact with the chassis.



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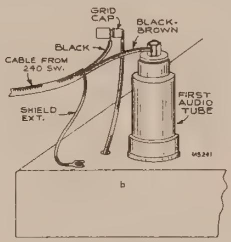
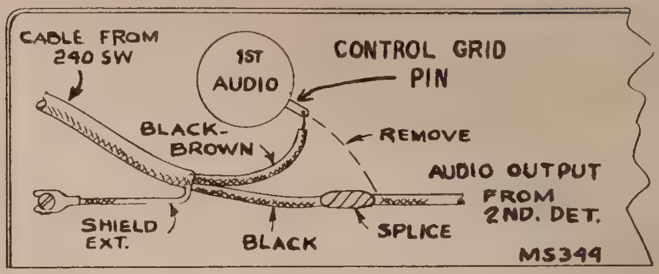


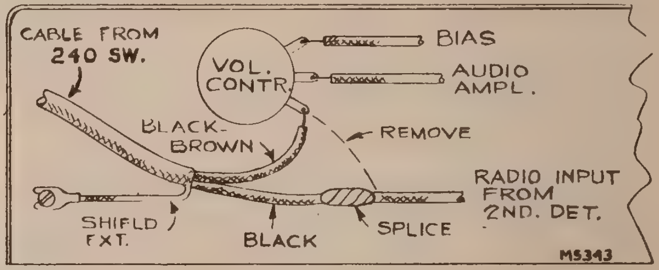
For radio receivers in which the 1st-audio tube has a top grid cap, quick simple connection can be made, without removing the chassis from the cabinet:

1. Fasten the switch to the cabinet or chassis.
2. Connect the braided shield extension to the radio chassis by either soldering or placing the spade lug under a mounting screw. (On a.c.-d.c. sets, see under Installation).
3. Disconnect the grid lead from the first audio tube.
4. Connect the cap on the black lead to the clip on the grid lead. as shown above.
5. Connect the clip on the black-brown lead to the grid cap at the top of the first audio tube, bending the terminal if necessary to proper size for a metal tube cap.
6. Insert the plug on the end of the record player lead into the jack on the bracket.
7. Secure or position the connection cable assembly so that the cap and clip terminals are well separated from each other and other metal parts.



For radio receivers in which the 1st audio tube does not have a top grid cap.

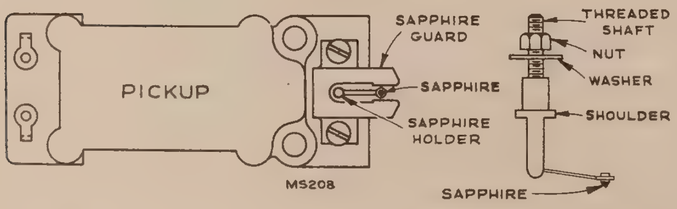
1. Fasten the switch to the cabinet or chassis.
2. Connect the braided shield extension to the radio chassis by either soldering or placing the spade lug under mounting screw. (On a.c.-d.c. sets, see under Installation).
3. Unsolder the lead from the control grid pin, first audio tube, as indicated in the diagram. It is usually necessary to remove the chassis from the cabinet in order to get at the tube sockets.
4. Remove "clip" and "cap" terminals from the ends of the switch cable.
5. Solder the black-brown lead to the pin disconnected in Step 3.
6. Solder the lead disconnected in Step 3 to the black lead. Wrap the joint with friction tape.
7. Insert the plug on the end of the record player lead into the jack on the bracket.



For radio receivers in which the volume control is in the audio input circuit, and where other hook-up methods are not feasible.

1. Fasten the switch to the cabinet or chassis.
2. Connect the braided shield extension to the radio chassis by either soldering or placing the spade lug under a mounting screw. (On a.c.-d.c. sets, see under Installation).
3. Unsolder the lead from the volume control lug indicated in the diagram. It is usually necessary to remove the chassis from the cabinet in order to get at the volume control lugs.
4. Remove "clip" and "cap" terminals from the ends of the switch cable.
5. Solder the black-brown lead to the lug disconnected in Step 3.
6. Solder the lead disconnected in Step 3 to the black lead. Wrap the joint with friction tape.
7. Insert the plug on the end of the record player lead into the jack on the bracket.

Replacement of Sapphire



CAUTION: Never bend the sapphire support wire.

The nut on the sapphire holder assembly may be locked by a light cement. Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft, if cement has been used. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Tone Compensation

Because of the widely varying frequency characteristics of various types of audio amplifiers with which the 6J may be used, it may be desirable in some cases to make refinements in the pickup circuit of the 6J to compensate for the characteristics of the amplifier. The following circuits show means of making such refinements.

In Figure 1, R1 controls the low-frequency response; larger values of R1 give increased lows. For maximum low-frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high-frequency response; to increase highs, increase C1.

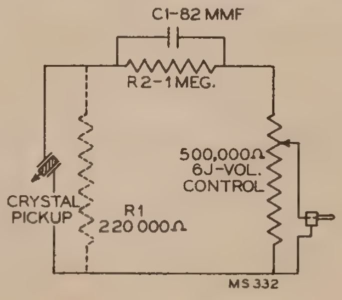


Fig. 1

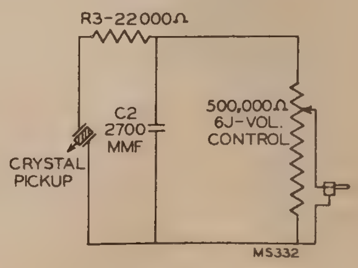


Fig. 2

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in Figure 2 is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in Figures 1 and 2 should serve as a basis from which slight alterations may be made to suit individual cases.

Model Q10
and Q10A
(Walnut)

RCA Victor
PH 75

Model Q10-2
and Q10A-2
(Ivory)

RCA MODELS
Q10, Q10A, Q10-2, Q10A-2

Chassis No. RC-594C—Mfr. No. 274

Service Data

1946 . . . . X5

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,680 kc (555-178 m)
Short Wave ("C" Band)	4.7-18.2 mc (63.8-16.5 m)

Intermediate Frequency .... 455 kc

RCA Tube Complement

(1) RCA-12SA7	1st Detector-Oscillator
(2) RCA-12SK7	I-F Amplifier
(3) RCA-12SQ7	2nd Detector, A.V.C. and A-F Amplifier
(4) RCA-50L6GT	Power Output
(5) RCA-35Z5GT	Rectifier

Power Supply Ratings (D-C or 40 to 100 cycles A-C)

Q10, Q10-2	105-125 volts	30 watts
Q10A, Q10A-2	210-250 volts	60 watts

Power Output Rating

Undistorted	1.25 watts
Maximum	3.1 watts

Loudspeaker (92510-2)

Type	5-inch Round Permanent-Magnet Dynamic
Voice Coil Impedance	4 ohms at 400 cycles

Tuning Drive Ratio .... 18 to 1

Dimensions (Inches)	Width	Height	Depth
Cabinet (Outside)	10 3/16	6 11/16	6 1/16
Chassis Base (Outside)	9 5/8	1 9/16	4 3/4
Chassis Overall	9 5/8	6 1/8	7

Weight Net .... 6 1/4 lbs. Weight Shipping .... 9 lbs.

CAUTION.—Repair of the power cord furnished with Models Q10A and Q10A-2 should not be attempted; apply to your RCA Distributor for a replacement.

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.
5. Keep body of C1A slightly away from chassis.

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-594C
70367	Capacitor—Mica trimmer, 2-10 mmf. (C7)
39622	Capacitor, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C1A, C17)
39643	Capacitor—Mica, 430 mmf. (C5A)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C1, C16, C18)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10, C20)
70615	Capacitor—Tubular, .05 mfd. 400 volts (C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11, C24)
70371	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts; and 1 section of 20 mfd., 20 volts (C22, C21, C19)
70360	Coil—Antenna coil (L1, L2, L3, L4, L5)
70359	Coil—Oscillator coil (L6, L7)
70366	Condenser—Variable tuning condenser (C2, C3, C5, C6)
38406	Control—Volume control and power switch (R4, S2)
32634	Cord—Drive cord (approx. 37 inches long)
70365	Core—Adjustable core and stud for oscillator coil
16058	Grommet—Rubber grommet for mounting speaker, 3 required (used only on some units)
37068	Indicator—Station selector indicator
70364	Nut—Speed nut to mount oscillator coil
70368	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
71290	Resistor—33 ohms, 1 watt (R10)
30880	Resistor—150 ohms, ½ watt (R7)
30152	Resistor—1000 ohms, 1 watt (R9)
30685	Resistor—33,000 ohms, ¼ watt (R1A)
30787	Resistor—47,000 ohms, ¼ watt (R3)
3252	Resistor—100,000 ohms, ¼ watt (R11)
30648	Resistor—470,000 ohms, ¼ watt (R5, R8)
30649	Resistor—2.2 megohms, ¼ watt (R1)
12928	Resistor—3.3 megohms, ¼ watt (R2)
30992	Resistor—10 megohms, ¼ watt (R6)
70369	Shaft—Tuning knob shaft
70363	Socket—3 pin socket for power cable located on rear apron
37605	Socket—Tube socket, moulded
31418	Spring—Tension spring for drive cord
70358	Switch—Range switch (S1)
70361	Transformer—First I-F transformer (L8, L9, C8, C9)
70362	Transformer—Second I-F transformer (L10, L11, C12, C13, C14, C15)
70370	Transformer—Output transformer (T1)
33726	Washer—Retaining washer for tuning shaft
	SPEAKER ASSEMBLY 92510-2
70372	Speaker—5-inch PM speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
37362	Clamp—Dial clamp (1 set)
70374	Cord—Power cord for 110 v. operation—Q10, Q10-2
70375	Cord—Power cord (resistance) for 220 v. operation—Q10A, Q10A-2
70373	Cover—Back cover less power cord
71023	Decal—Trade mark decalcomania
70376	Dial—Dial scale
37831	Fastener—Push fastener for back cover (1 set)
35121	Knob—Range switch knob—Q10, Q10A
35123	Knob—Range switch knob—Q10-2, Q10A-2
36722	Knob—Volume control or tuning knob—Q10
70414	Knob—Volume control or tuning knob—Q10-2
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator through a .01 mfd. capacitor to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. output—
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	B. C.; 1600 kc quiet point	L11-L10 (2nd I-F Trans.)
2	Stator of gang cond. C2 through 0.1 mfd.			L9-L8* (1st I-F Trans.)
3	Antenna lead through 300 ohm resistor	18.2 mc	S. W.; gang condenser open	C6 (osc.)**
4		15.2 mc	S. W.; maximum signal rock gang	C3 (ant.)***
5	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; 600 kc (2nd mark from left)	L7 (osc.)
6		1300 kc	B. C.; rock gang at 1300 kc†	C7 (osc.)
7		600 kc	B. C.; rock gang at 600 kc	L7 (osc.)
8	Repeat steps 6 and 7			

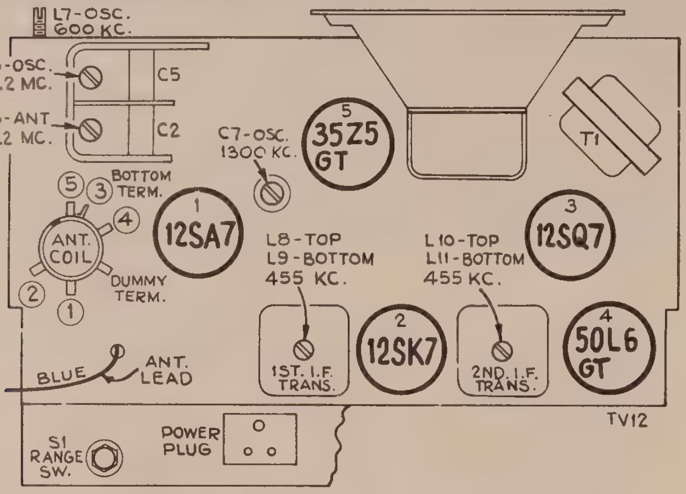
† 1300 kc corresponds to a point ½ inch to the left of the right hand mark on the dial backing plate.

* Do not readjust L10 or L11 when test oscillator is connected to C2.

** Use minimum capacity peak if two peaks can be obtained.

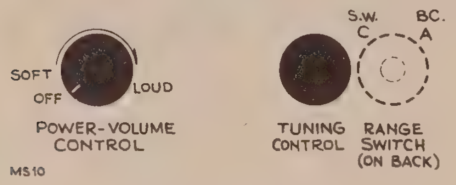
*** Image signal of lesser amplitude should occur at 14.3 mc.

NOTE.—Oscillator tracks above signals on both bands.



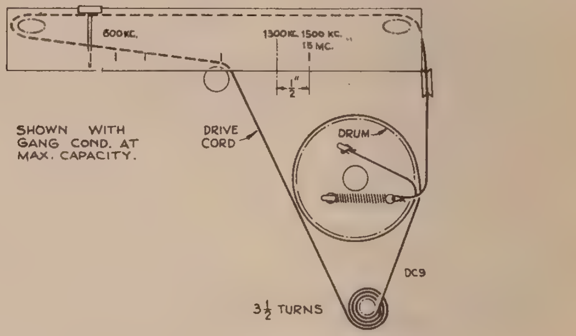
L7-OSC. 600 KC.
C6-OSC. 18.2 MC.
C3-ANT. 15.2 MC.
C5
C2
C7-OSC. 1300 KC.
5 35Z5 GT
T1
BOTTOM TERM.
ANT. COIL
DUMMY TERM.
1 12SA7
L8-TOP L9-BOTTOM 455 KC.
L10-TOP L11-BOTTOM 455 KC.
3 12SQ7
BLUE
ANT. LEAD
1ST. I.F. TRANS.
2 12SK7
2ND. I.F. TRANS.
4 50L6 GT
TV12
S1 RANGE SW.
POWER PLUG

Tube and Trimmer Locations



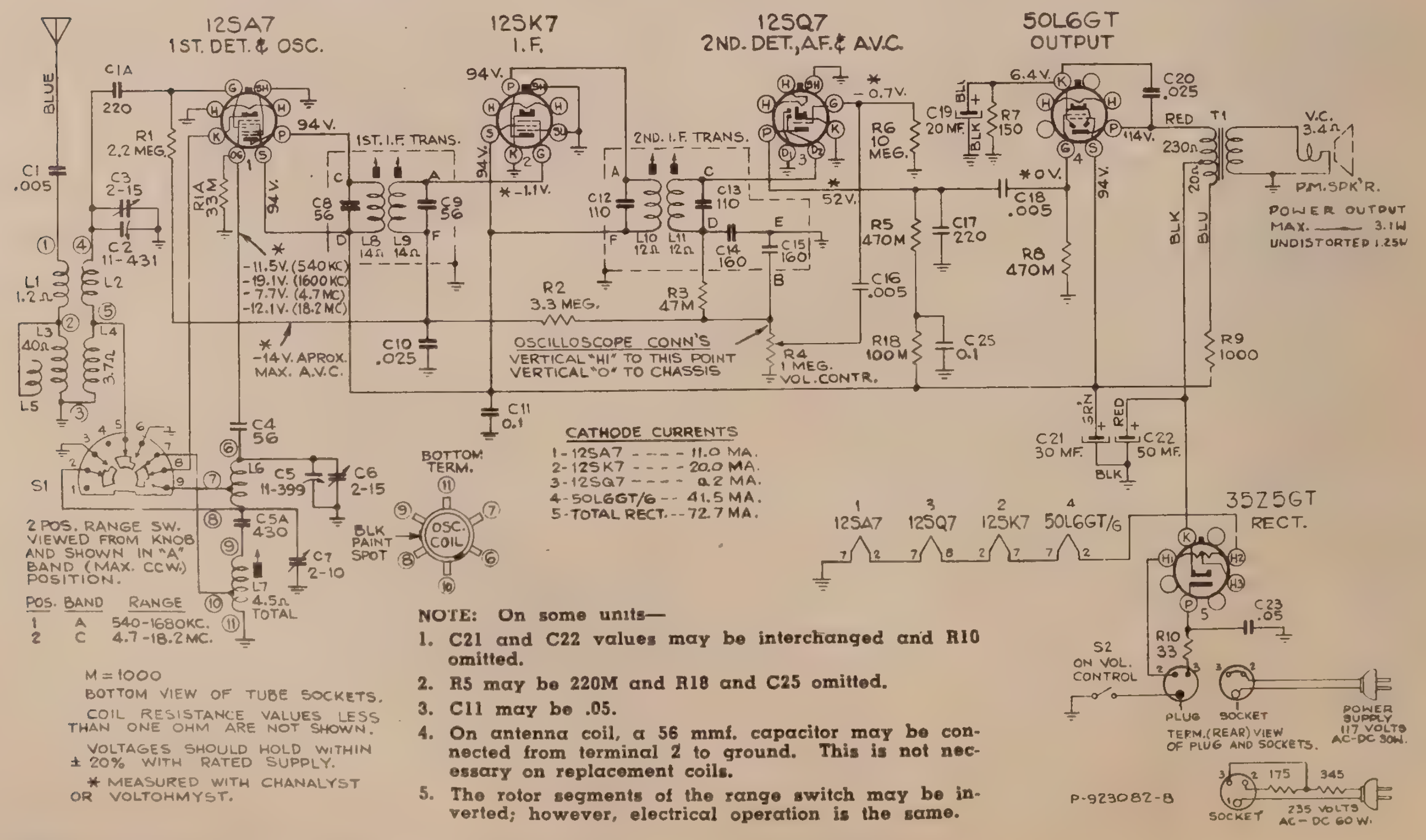
SOFT
OFF
LOUD
POWER-VOLUME CONTROL
S.W. C
BC. A
TUNING CONTROL
RANGE SWITCH (ON BACK)
MS10

Location of Controls



600KC.
1300KC. 1500 KC.
15 MC.
1"/2
SHOWN WITH GANG COND. AT MAX. CAPACITY.
DRIVE CORD
DRUM
DC9
3½ TURNS

Dial Indicator and Drive Mechanism



12SA7
1ST. DET. & OSC.
12SK7
I.F.
12SQ7
2ND. DET., A.F. & A.V.C.
50L6GT
OUTPUT
BLUE
C1A 220
R1 2.2 MEG.
C1 .005
C3 2-15
C2 11-431
L1 1.2Ω
L2
L3 40Ω
L4 3.7Ω
L5
R1A 33M
94 V.
1ST. I.F. TRANS.
C8 56
C9 56
L8 14Ω
L9 14Ω
* -11.5V. (540KC) -19.1V. (1600KC) -7.7V. (4.7MC) -12.1V. (18.2MC)
* -14V. APROX. MAX. A.V.C.
C10 .025
* -1.1V.
2ND. I.F. TRANS.
C12 110
C13 110
L10 12Ω
L11 12Ω
C14 160
C15 160
R2 3.3 MEG.
R3 47M
OSCILLOSCOPE CONN'S VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS
R4 1 MEG. VOL. CONTR.
C11 0.1
* -0.7V.
R6 10 MEG.
C19 20 MF.
R7 150
BLK
6.4V.
C20 .025
*0V.
C18 .005
52V.
R5 470M
C17 220
R8 470M
C16 .005
R18 100M
C25 0.1
114V.
RED
T1
230Ω
20Ω
V.C. 3.4Ω
P.M. SPK'R.
POWER OUTPUT MAX. 3.1W UNDISTORTED 1.25W
BLU
R9 1000
C21 30 MF.
C22 50 MF.
GRN
C4 56
L6
C5 11-399
C6 2-15
C5A 430
C7 2-10
L7 4.5Ω TOTAL
S1
BOTTOM TERM.
BLK PAINT SPOT
OSC. COIL
CATHODE CURRENTS
1-12SA7 ---- 11.0 MA.
2-12SK7 ---- 20.0 MA.
3-12SQ7 ---- 0.2 MA.
4-50L6GT/6 -- 41.5 MA.
5-TOTAL RECT. -- 72.7 MA.
1 12SA7
3 12SQ7
2 12SK7
4 50L6GT/6
35Z5GT RECT.
C23 .05
R10 33
S2 ON VOL. CONTROL
PLUG
SOCKET
TERM. (REAR) VIEW OF PLUG AND SOCKETS.
POWER SUPPLY 117 VOLTS AC-DC 30W.
175
345
SOCKET
235 VOLTS AC-DC 60 W.
P-923082-8
2 POS. RANGE SW. VIEWED FROM KNOB AND SHOWN IN "A" BAND (MAX. CCW.) POSITION.
POS. BAND RANGE
1 A 540-1680KC.
2 C 4.7-18.2MC.
M = 1000
BOTTOM VIEW OF TUBE SOCKETS.
COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.

NOTE: On some units—

1. C21 and C22 values may be interchanged and R10 omitted.
2. R5 may be 220M and R18 and C25 omitted.
3. C11 may be .05.
4. On antenna coil, a 56 mmf. capacitor may be connected from terminal 2 to ground. This is not necessary on replacement coils.
5. The rotor segments of the range switch may be inverted; however, electrical operation is the same.

Schematic Diagram

NOTE.—The power cord of Models Q10A and Q10A-2 should be uncoiled and kept free of surrounding objects to provide adequate ventilation. Sharp bends and kinks should be avoided.

Model QB11

Models QB12 & QB13

RCA MODELS
QB11, QB12, QB13

Chassis No. RC-529A RC-612

Mfr. No. 274

Service Data

1947 . . . . X 3

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Electrical and Mechanical Specifications

Frequency Ranges

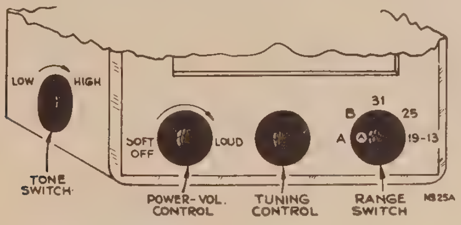
Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.9-9.5 mc (103-31.6 m)
"31" Meter Spread Band	9.5-12 mc (31.6-25 m)
"25" Meter Spread Band	11.7-15 mc (25.6-20 m)
"19-13" Meter Spread Band	15.1-22 mc (19.9-13.6 m)

Intermediate Frequency.......................................455 kc

RCA Tube Complement

	RC-529A	RC-612	
(1)	RCA-6SA7	RCA-6SA7	1st-Det.—Osc.
(2)	RCA-6S7*	RCA-6SS7	I-F Amplifier
(3)	RCA-6T7-G*	RCA-6AQ6	2nd-Det., A.V.C., and 1st Audio
(4)	RCA-6J7	RCA-6AK6	Driver
(5)	RCA-6Z7-G	RCA-6Z7G	Power Output

*In some units, a 6K7 may be substituted for the 6S7 and a 6Q7 in place of the 6T7G.


LOW
HIGH
TONE SWITCH
SOFT OFF
LOUD
POWER-VOL. CONTROL
TUNING CONTROL
B
31
25
A
19-13
RANGE SWITCH
N825A

Location of Controls

Power Supply Rating

With vibrator power supply unit (RS-115):

6.3 volts, total current drain	*RC-529A	3.35 amperes
	RC-612	3.2 amperes

*If both tube substitutions are made, the total current consumption will be increased to 3.65 Amperes.

Power Output	**RC-529A**	**RC-612**
Undistorted	3.1 watts	2.1 watts
Maximum	4.5 watts	3.1 watts

Loudspeaker (92519-1)

Type.............................6½ inch, permanent-magnet dynamic
Voice-coil Impedance at 400 cycles.........................3.4 ohms

		Height	Length	Depth
Cabinet Dimensions	QB11	11⅝"	17⅛"	7½"
	QB12 & QB13	10⅞"	16¼"	7⅝"

Net Weight	QB11	21.5 lbs.
	QB12 & QB13	20.0 lbs.

Tuning Drive Ratio..25:1

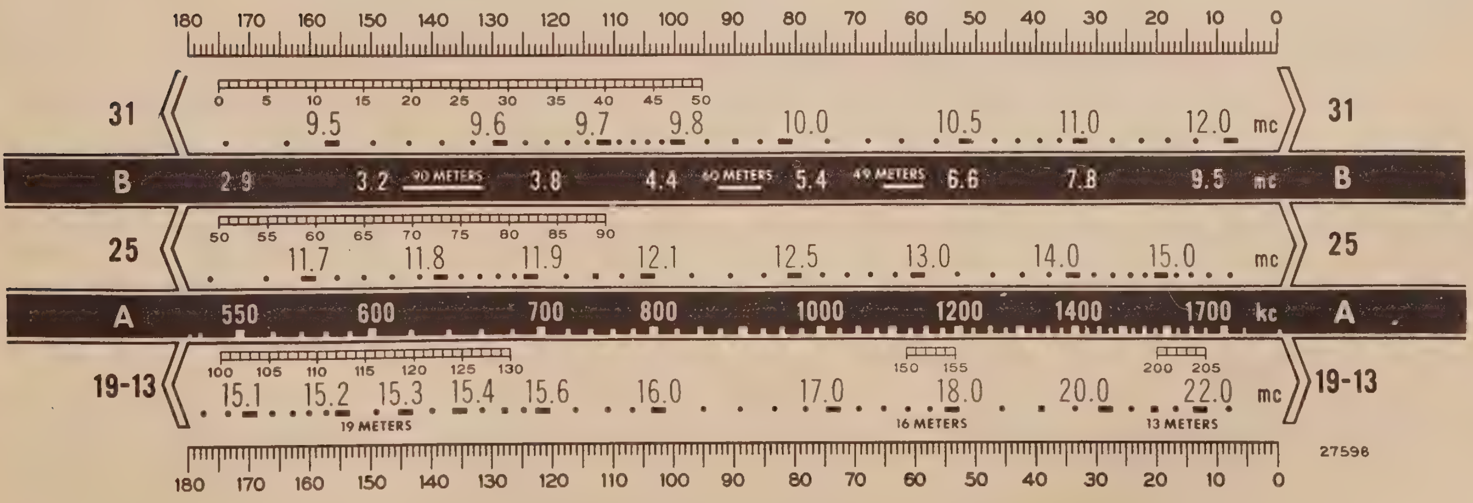
Phonograph Attachment

A jack is provided on the rear of chassis for connecting a Phonograph attachment to the audio amplifying circuit.

When Phonograph attachment is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

When Phonograph attachment is not in use its plug should be disconnected.

RECEIVER DIAL WITH CALIBRATION SCALE


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
31
0 5 10 15 20 25 30 35 40 45 50
9.5 9.6 9.7 9.8 10.0 10.5 11.0 12.0 mc
31
B
2.9 3.2 90 METERS 3.8 4.4 60 METERS 5.4 49 METERS 6.6 7.8 9.5 mc
B
25
50 55 60 65 70 75 80 85 90
11.7 11.8 11.9 12.1 12.5 13.0 14.0 15.0 mc
25
A
550 600 700 800 1000 1200 1400 1700 kc
A
19-13
100 105 110 115 120 125 130
150 155
200 205
15.1 15.2 15.3 15.4 15.6 16.0 17.0 18.0 20.0 22.0 mc
19-13
19 METERS
16 METERS
13 METERS
27598
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

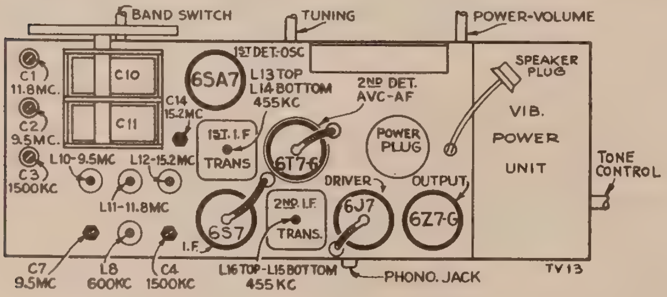
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

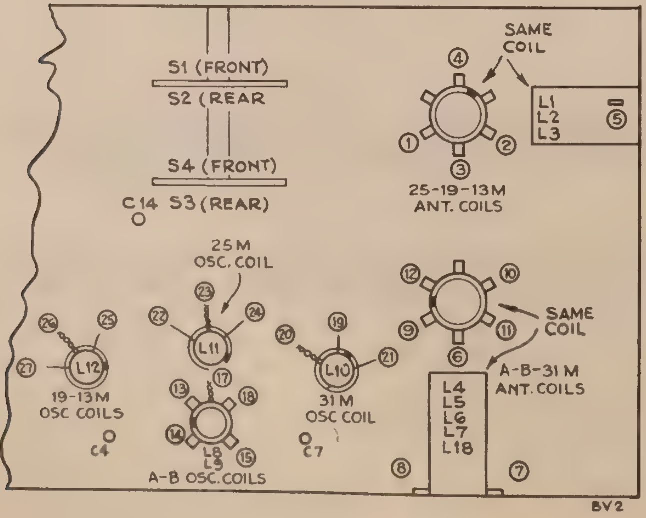
1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetite-core for each band should be re-touched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."


BAND SWITCH
TUNING
POWER-VOLUME
C1 11.8MC.
C2 9.5MC.
C3 1500KC
C10
C11
C14 15.2MC
6SA7
1ST DET.-OSC
L13 TOP
L14 BOTTOM
455KC
1ST. I.F TRANS
2ND DET. AVC-AF
6T7-G
POWER PLUG
SPEAKER PLUG
VIB. POWER UNIT
TONE CONTROL
L10-9.5MC
L12-15.2MC
L11-11.8MC
DRIVER
OUTPUT
6S7
I.F.
2ND. I.F. TRANS.
6J7
6Z7-G
C7 9.5MC
L8 600KC
C4 1500KC
L16 TOP-L15 BOTTOM 455KC
PHONO. JACK
TV13

RC529A Tube and Trimmer Locations (Top Chassis View)


S1 (FRONT)
S2 (REAR
S4 (FRONT)
C14
S3 (REAR)
SAME COIL
④
①
②
③
L1
L2
L3
⑤
25-19-13M ANT. COILS
25M OSC. COIL
㉓
㉒
㉔
L11
㉖
㉕
㉗
L12
19-13M OSC COILS
C4
⑬
⑰
⑱
⑭
L8
L9
⑮
A-B OSC. COILS
⑲
⑳
㉑
L10
31M OSC COIL
C7
⑫
⑩
⑨
⑪
⑥
SAME COIL
A-B-31M ANT. COILS
L4
L5
L6
L7
L18
⑧
⑦
BV2

Coil and Band Switch Locations (Bottom Chassis View)

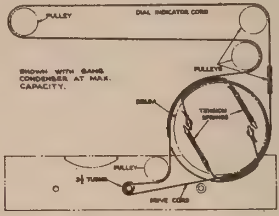
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet point near 180°	L16—L15 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L14—L13 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.)* C1 (ant.)
4		15.2 mc		17°	C14 (osc.)***
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc.)*
7		9.5 mc	31M	156°	L10 (osc.)* C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.)** C3 (ant.)
10		600 kc		150°	L8 (osc.)* (Rock gang.)
11		Repeat steps 9 and 10.			

*If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

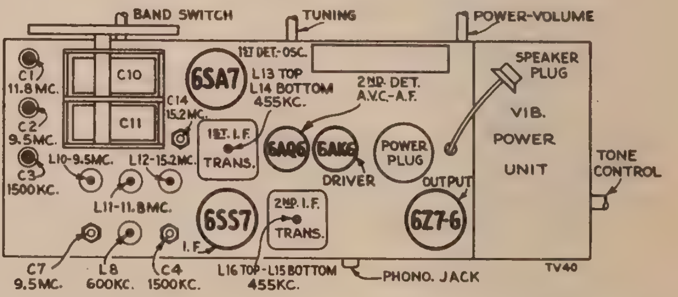
**Use minimum capacity peak if two can be obtained.

***Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.


PULLEY
DIAL INDICATOR CORD
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
PULLEYS
DRUM
TENSION SPRINGS
PULLEY
3/4 TUNING
DRIVE CORD

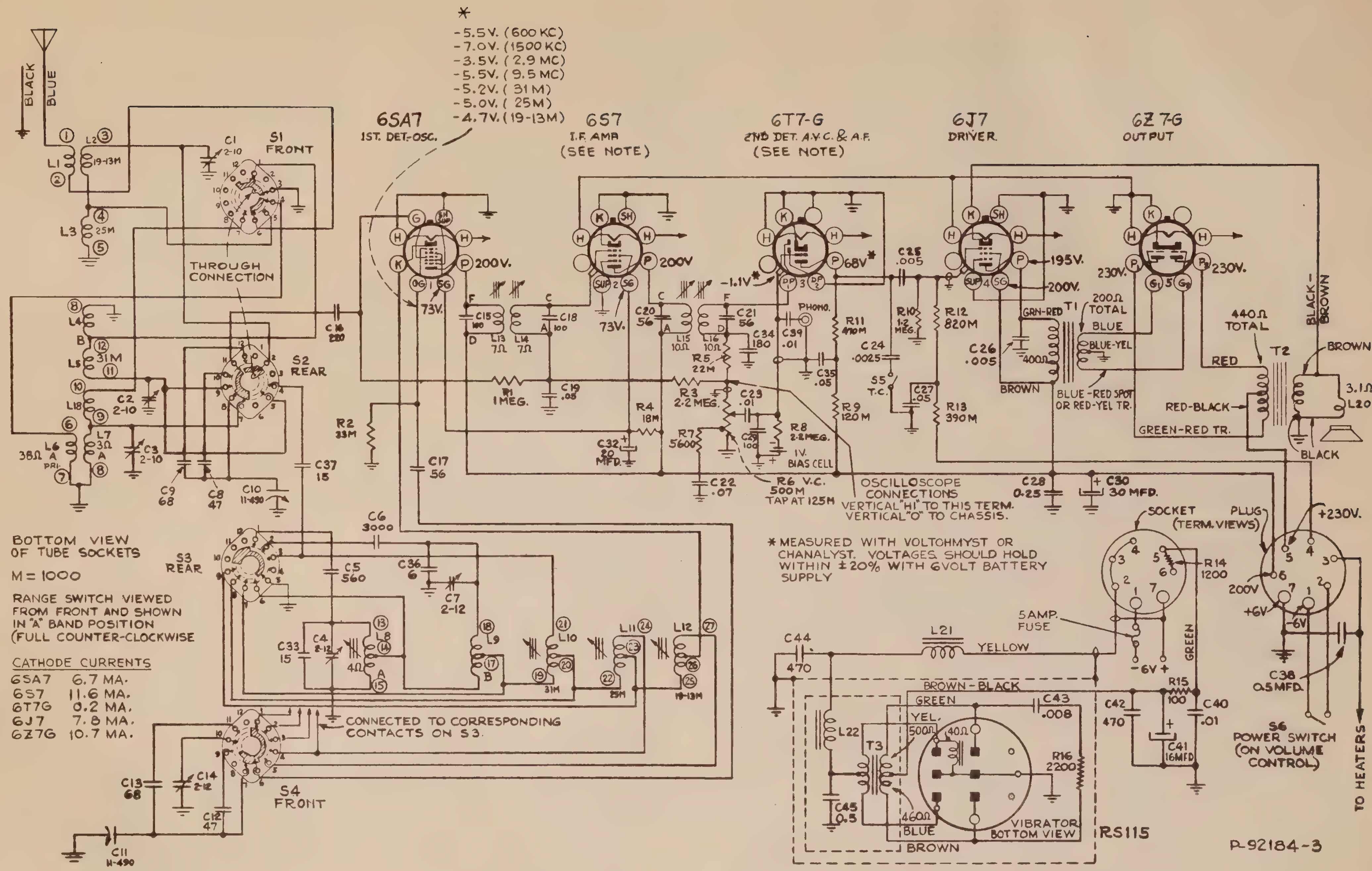
Dial-Indicator and Drive Mechanism


BAND SWITCH
TUNING
POWER-VOLUME
C1 11.8MC.
C2 9.5MC.
C3 1500KC.
C10
C11
C14 15.2MC.
6SA7
1ST DET.-OSC.
L13 TOP
L14 BOTTOM
455KC.
1ST. I.F. TRANS.
2ND. DET. A.V.C.-A.F.
6AQ6
6AK6
DRIVER
POWER PLUG
SPEAKER PLUG
VIB. POWER UNIT
TONE CONTROL
L10-9.5MC.
L12-15.2MC.
L11-11.8MC.
OUTPUT
6SS7
I.F.
2ND. I.F. TRANS.
6Z7-G
C7 9.5MC.
L8 600KC.
C4 1500KC.
L16 TOP-L15 BOTTOM 455KC.
PHONO. JACK
TV40

RC-612 Tube and Trimmer Locations (Top Chassis View)

Precautionary Lead Dress.

1. Twist yellow lead from terminal 14 of L8 to terminal 6 of S3 with the lead from terminal 27 of L12 to terminal 5 of S4.
2. All other oscillator coil leads must be kept apart from each other as well as from other leads and parts. No two leads may be less than ⅛ inch apart.
3. The lead from the tap on 19-13 oscillator coil to pin number 6 (K) of 6SA7 socket should be dressed up and away from all parts as far as possible.
4. Condensers C8, C9 and C16 must be as far away from all metal parts as possible.
5. All leads from the antenna coil to the range switch should be dressed together.
6. The green lead from pin 4 (SG) of 6SA7 socket to pin †4 (SG) of 6S7 socket should be dressed down against the chassis and away from the I.F. terminals.
   †For QB11 & QB12 only (RC-529A). For QB13 (RC-612) it is pin 6 (SG) of 6SS7 socket.
7. All leads and parts must clear the tuning flywheel by at least ⅛ inch.
8. The leads to the power switch should be twisted together and dressed away from other leads and parts as much as possible.
9. Capacitor C34 must be mounted edgewise and close to the chassis with the leads as short as possible.
10. QB11 & QB12 only (RC-529A). The bias cell must be installed in the correct polarity. The lead from resistor R8 must go to the bias cells metal container.
11. QB13 only (RC-612). The green lead from term. C of 1st I-F trans tc pin 4 (G) of 6SS7 must be short and close to chassis under all othe leads.


6SA7
1ST. DET.-OSC.
6S7
I.F. AMP.
(SEE NOTE)
6T7-G
2ND DET. A.V.C. & A.F.
(SEE NOTE)
6J7
DRIVER
6Z7-G
OUTPUT
BLACK
BLUE
S1 FRONT
S2 REAR
S3 REAR
S4 FRONT
THROUGH CONNECTION
CONNECTED TO CORRESPONDING CONTACTS ON S3.
200V.
73V.
-1.1V*
68V*
195V.
230V.
PHONO.
S5 T.C.
R6 V.C. 500M TAP AT 125M
1V. BIAS CELL
OSCILLOSCOPE CONNECTIONS VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
T1
T2
200Ω TOTAL
440Ω TOTAL
GRN-RED
BLUE-YEL
BLUE-RED SPOT OR RED-YEL TR.
BROWN
RED
RED-BLACK
GREEN-RED TR.
BLACK-BROWN
BLACK
3.1Ω L20
SOCKET
PLUG (TERM. VIEWS)
+230V.
+6V
-6V
R14 1200
5 AMP. FUSE
YELLOW
GREEN
BROWN-BLACK
VIBRATOR BOTTOM VIEW
RS115
C38 0.5 MFD.
S6 POWER SWITCH (ON VOLUME CONTROL)
TO HEATERS
P-92184-3

*
-5.5V. (600 KC)
-7.0V. (1500 KC)
-3.5V. (2.9 MC)
-5.5V. (9.5 MC)
-5.2V. (31M)
-5.0V. (25M)
-4.7V. (19-13M)

BOTTOM VIEW OF TUBE SOCKETS

M = 1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION (FULL COUNTER-CLOCKWISE

CATHODE CURRENTS	
6SA7	6.7 MA.
6S7	11.6 MA.
6T7G	0.2 MA.
6J7	7.8 MA.
6Z7G	10.7 MA.

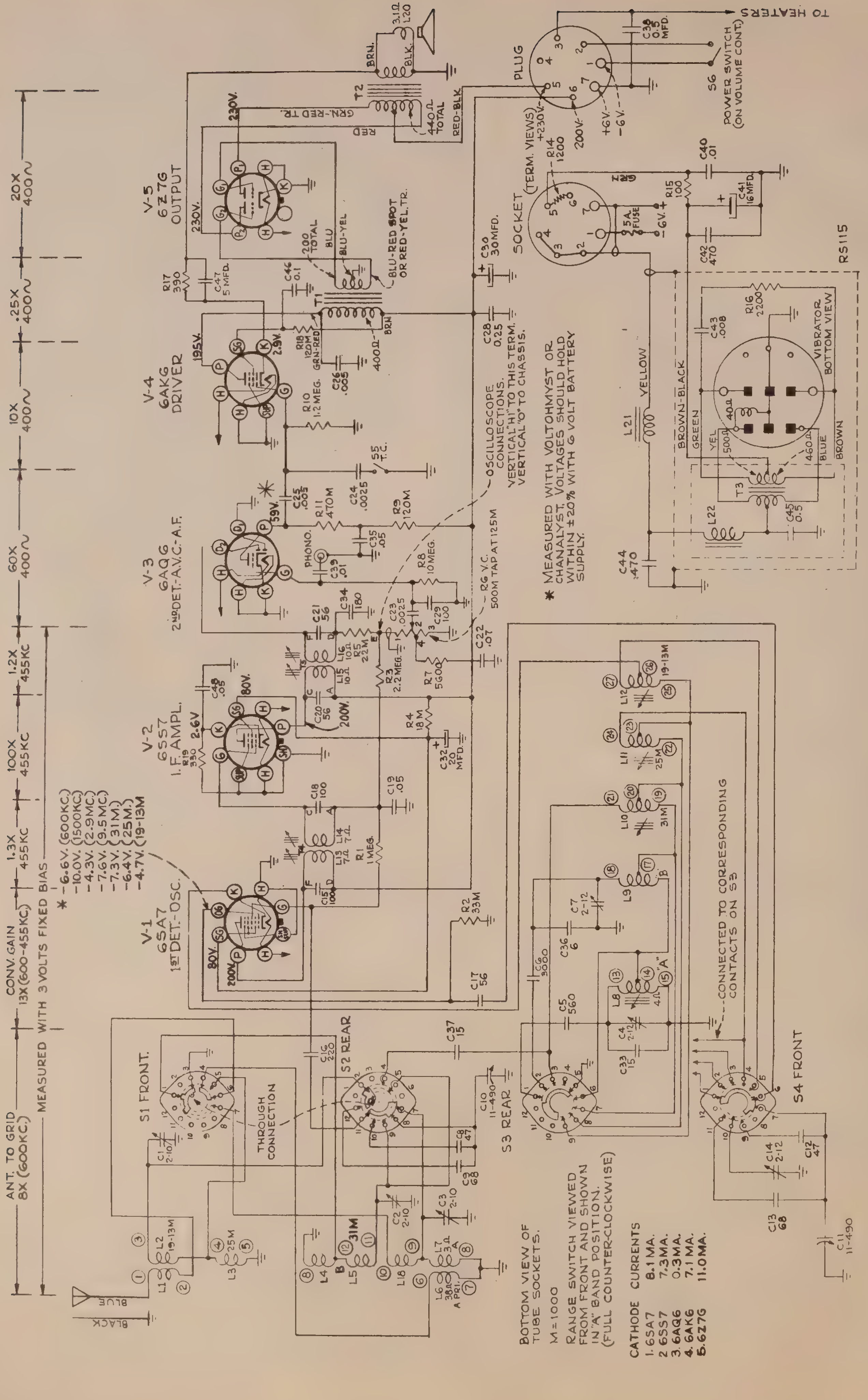
*MEASURED WITH VOLTOHMYST OR CHANALYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 6VOLT BATTERY SUPPLY

QB11 and QB12
RC-529A

Schematic Circuit Diagram

(Refer to following pages for simplified schematic diagrams of antenna and oscillator circuits)

NOTE In some units, a 6K7 may be substituted for the 6S7 and a 6Q7 in place of the 6T7G.

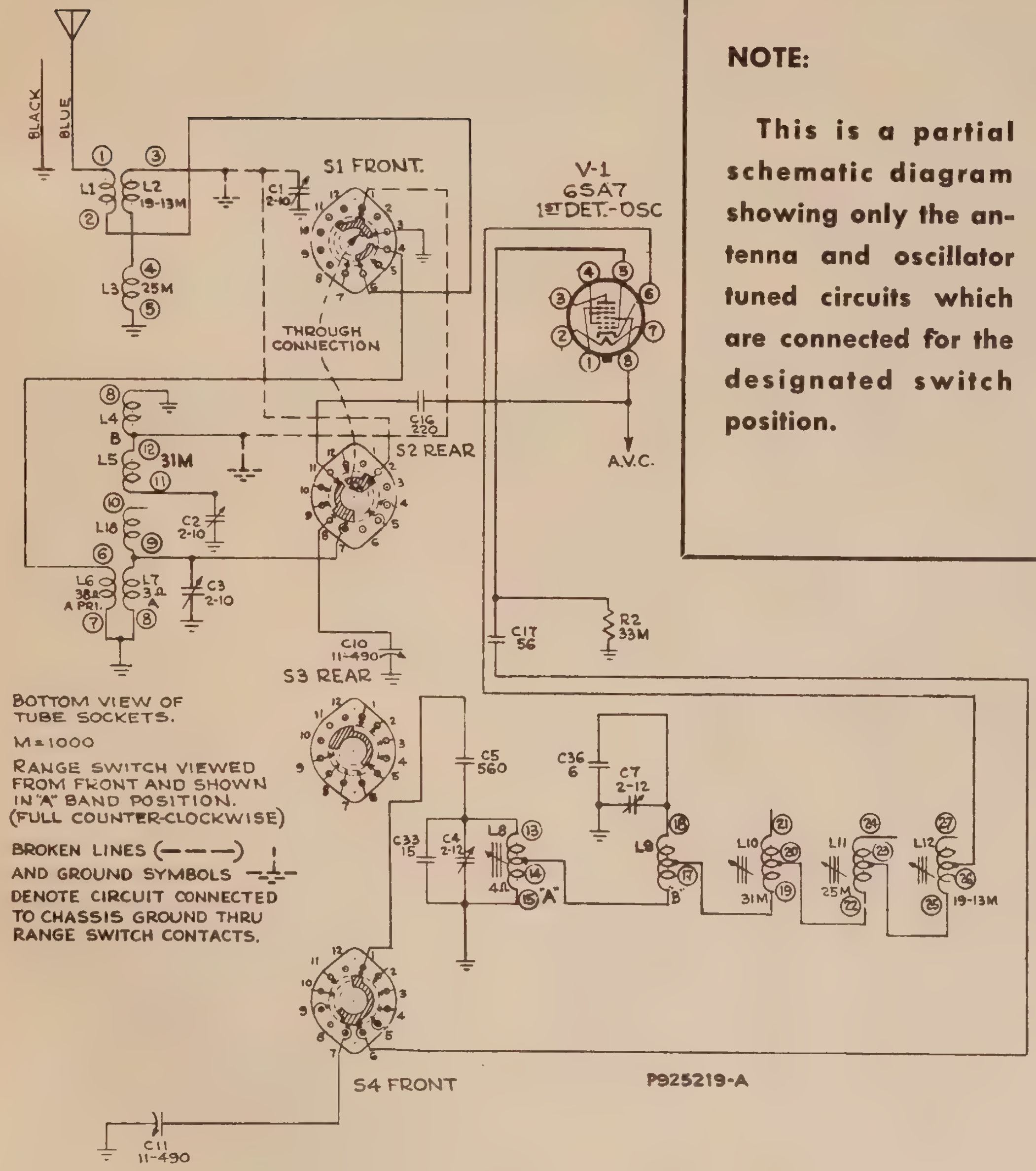


ANT. TO GRID 8X (600KC.)
CONV. GAIN 13X (600-455KC)
1.3X 455KC
100X 455KC
1.2X 455KC
60X 400∿
10X 400∿
.25X 400∿
20X 400∿
MEASURED WITH 3 VOLTS FIXED BIAS
* -6.6V. (600KC.) -10.0V. (1500KC.) -4.3V. (2.9MC.) -7.6V. (9.5MC.) -7.3V. (31M.) -6.4V. (25M.) -4.7V. (19-13M.)
V-1 6SA7 1ST DET.-OSC.
V-2 6SS7 I.F. AMPL.
V-3 6AQ6 2ND DET.-A.V.C.-A.F.
V-4 6AK6 DRIVER
V-5 6Z7G OUTPUT
S1 FRONT
S2 REAR
S3 REAR
S4 FRONT
THROUGH CONNECTION
CONNECTED TO CORRESPONDING CONTACTS ON S3
PHONO.
OSCILLOSCOPE CONNECTIONS. VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
R6 V.C. 500M TAP AT 125M
S5 T.C.
* MEASURED WITH VOLTOHMYST OR CHANALYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 6 VOLT BATTERY SUPPLY.
SOCKET (TERM. VIEWS)
PLUG
TO HEATERS
S6 POWER SWITCH (ON VOLUME CONT.)
5A. FUSE
VIBRATOR BOTTOM VIEW
RS115
YELLOW
BROWN-BLACK
GREEN
YEL
BLUE
BROWN
BLU-RED SPOT OR RED-YEL. TR.
GRN.-RED TR.
RED-BLK
BLUE
BLACK
BOTTOM VIEW OF TUBE SOCKETS.
M=1000
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION. (FULL COUNTER-CLOCKWISE)
CATHODE CURRENTS
1. 6SA7 8.1 MA.
2. 6SS7 7.3 MA.
3. 6AQ6 0.3 MA.
4. 6AK6 7.1 MA.
5. 6Z7G 11.0 MA.

QB13 RC-612

Schematic Circuit Diagram

(Refer to following pages for simplified schematic diagrams of antenna and oscillator circuits)


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC
C16 220
S2 REAR
A.V.C.
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C17 56
R2 33M
C10 11-490
S3 REAR
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8
4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
P925219-A
C11 11-490

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION. (FULL COUNTER-CLOCKWISE)

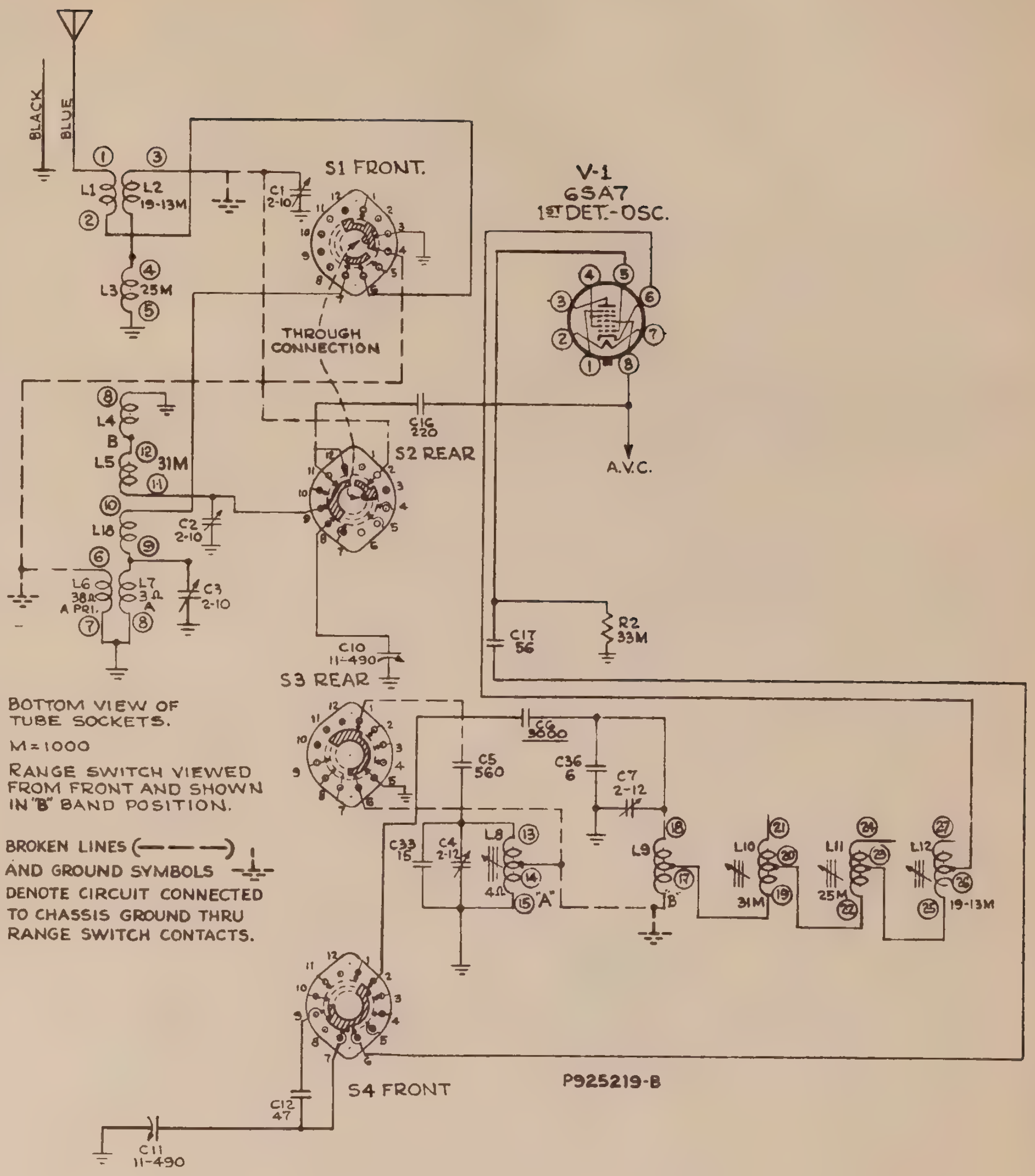
BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"A Band"

NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
C16 220
S2 REAR
A.V.C.
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C17 56
R2 33M
C10 11-490
S3 REAR
C6 3650
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8
4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
P925219-B
C12 47
C11 11-490

BOTTOM VIEW OF TUBE SOCKETS.

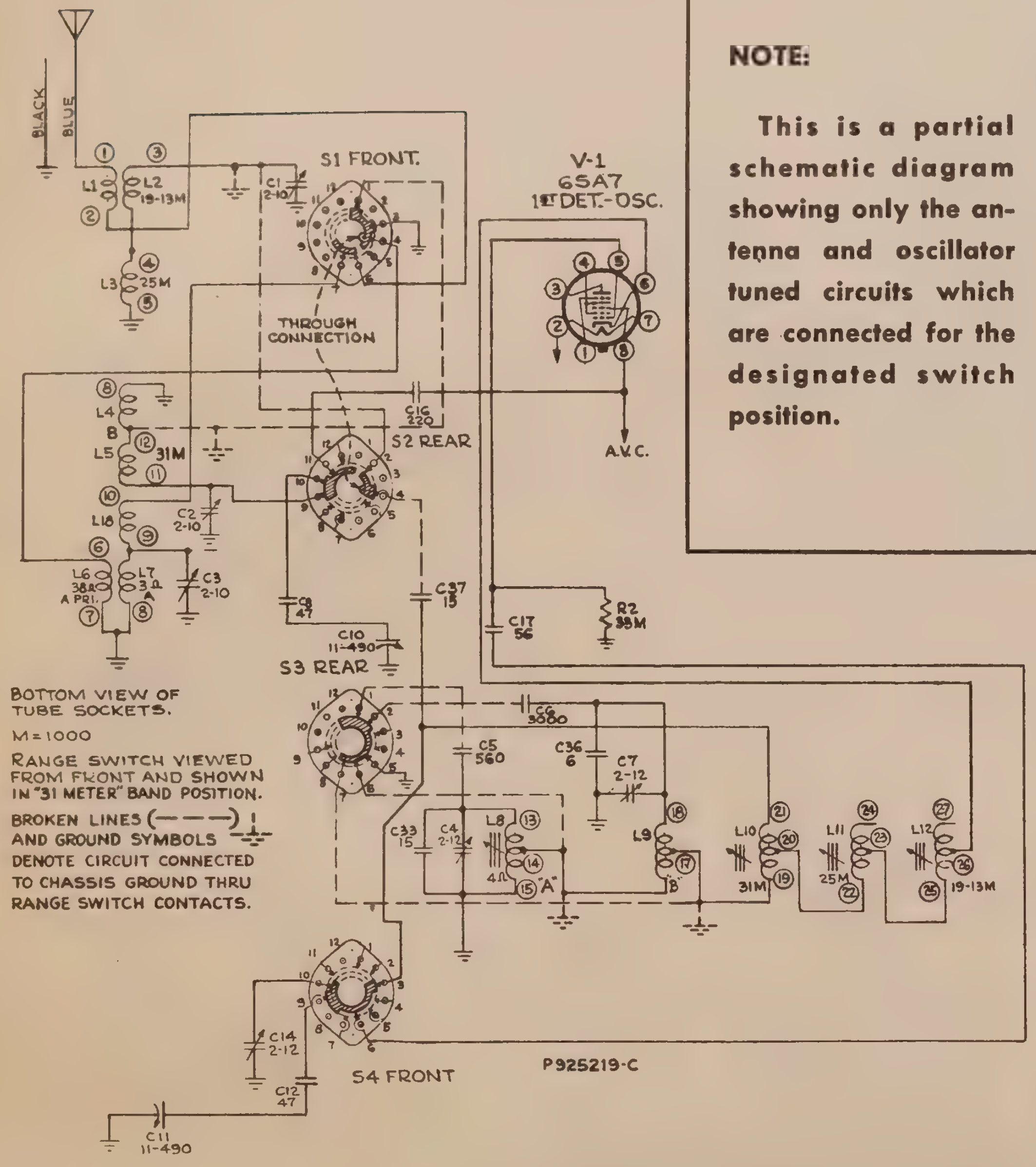
M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "B" BAND POSITION.

BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"B Band"


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
C16 220
S2 REAR
A.V.C.
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C8 47
C37 15
C17 56
R2 33M
C10 11-490
S3 REAR
C6 3080
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
C14 2-12
C12 47
S4 FRONT
C11 11-490
P925219-C

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "31 METER" BAND POSITION.

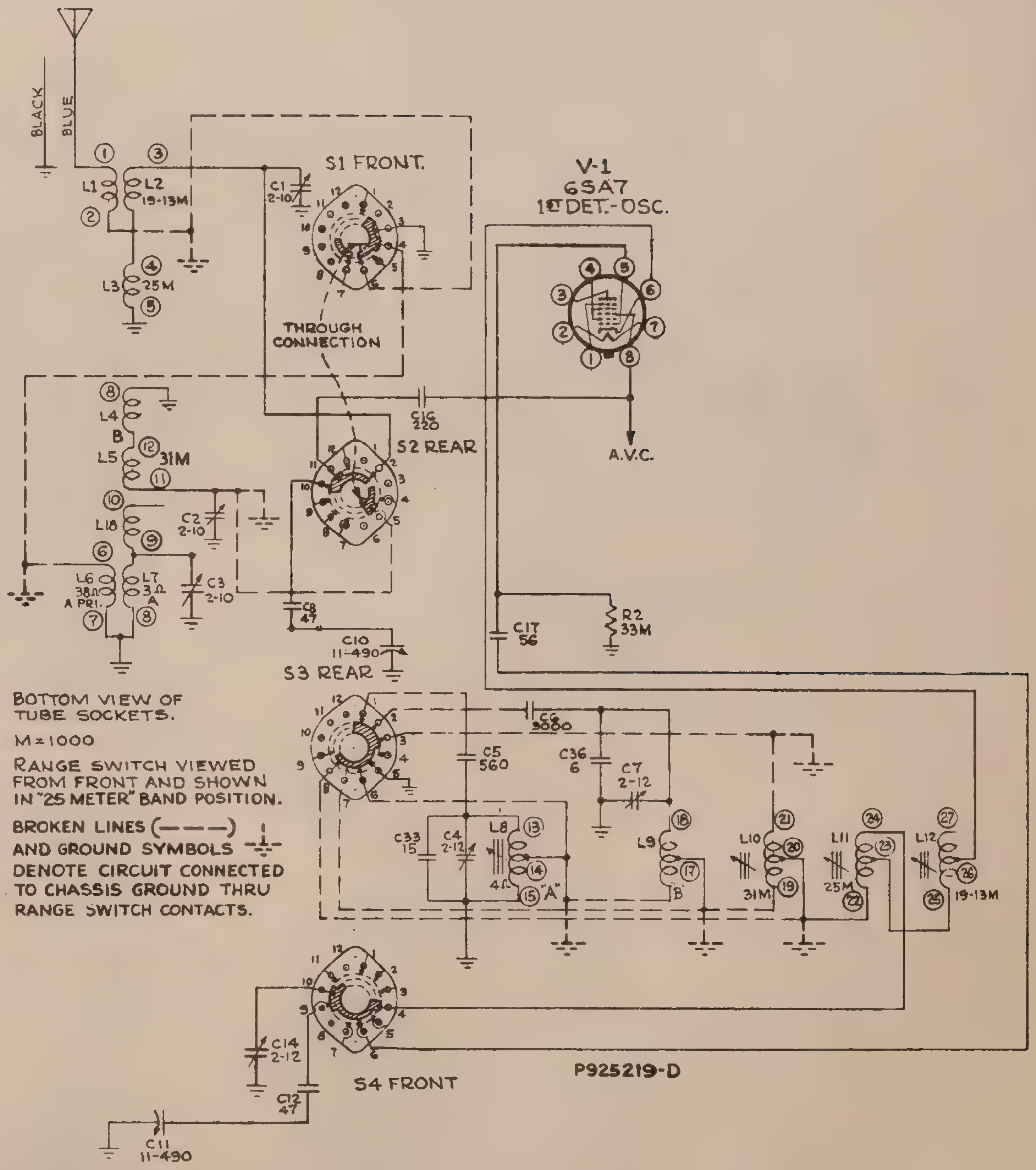
BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"31 Meter Band"

NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
C16 220
S2 REAR
A.V.C.
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C8 47
C17 56
R2 33M
C10 11-490
S3 REAR
C6 3080
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
C14 2-12
C12 47
S4 FRONT
C11 11-490
P925219-D

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "25 METER" BAND POSITION.

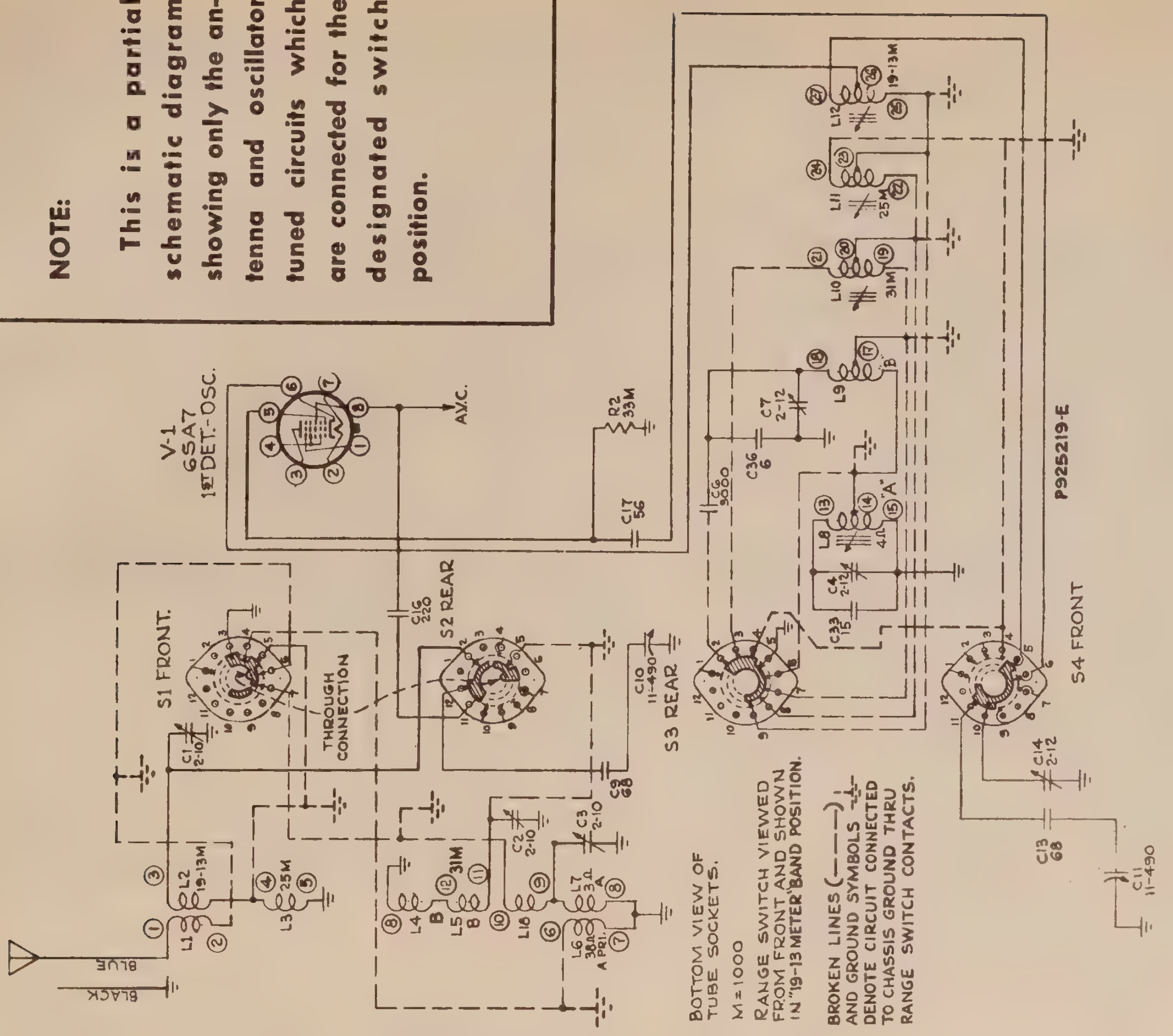
BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"25 Meter Band"

NOTE:

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


V-1
6SA7
1st DET.-OSC.
A.V.C.
R2 33M
C17 56
C6 3000
C36 6
C7 2-12
L9
L10 31M
L11 25M
L12 19-13M
L8 4Ω
C4 2-12
C33 15
P925219-E
S1 FRONT
S2 REAR
S3 REAR
S4 FRONT
C16 220
THROUGH CONNECTION
C10 11-490
C1 2-10
C9 68
C14 2-12
C13 68
C11 11-490
L2 19-13M
L3 25M
L1
L4 A
L5 B
31M
L16
C2 2-10
C3 2-10
L7 3Ω A
L6 38Ω A PRI.
BLUE
BLACK
BOTTOM VIEW OF TUBE SOCKETS.
M=1000
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "19-13 METER" BAND POSITION.
BROKEN LINES (----) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

Simplified Schematic Diagram
Antenna & Oscillator Circuits

"19-13 Meter Band"

Replacement Parts

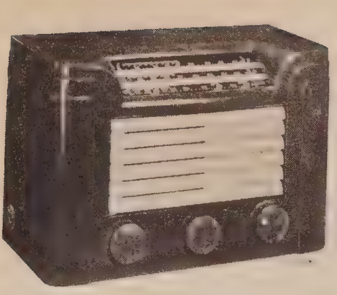
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **QB11 & QB12 (RC-529A)**
35640	Bracket—Support bracket complete with one (1) drive cord pulley
35639	Bracket—Support bracket complete with three (3) drive cord pulleys
35622	Bracket—Support bracket for tuning knob shaft
37976	Bracket—Support bracket for tone control
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)
34654	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
35646	Capacitor—Ceramic, 6 mmf. (C36)
36012	Capacitor—Ceramic, 15 mmf. (C37)
45465	Capacitor—Ceramic, 15 mmf. (C33)
70582	Capacitor—Ceramic, 47 mmf. (C8)
35644	Capacitor—Ceramic, 47 mmf. (C12)
39622	Capacitor—Mica, 56 mmf. (C17)
39632	Capacitor—Mica, 56 mmf (C20, C21)
35645	Capacitor—Ceramic, 68 mmf. (C13)
70586	Capacitor—Mica, 68 mmf. (C9)
39628	Capacitor—Mica, 100 mmf. (C15, C18, C29)
39634	Capacitor—Mica, 180 mmf. (C34)
39636	Capacitor—Mica, 220 mmf. (C16)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70644	Capacitor—Tubular, .0025 mfd., 1400 volts (C24)
70627	Capacitor—Tubular, .005 mfd., 500 volts (C25, C26)
*70641	Capacitor—Tubular, .01 mfd., 1000 volts (C23, C39)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C27, C35)
71010	Capacitor—Tubular, .07 mfd., 400 volts (C22)
70619	Capacitor—Tubular, 0.5 mfd., 150 volts (C38)
70618	Capacitor—Tubular, .025 mfd., 300 volts (C28)
37250	Capacitor—Electrolytic, 20 mfd., 250 volts (C32)
37867	Capacitor—Electrolytic, 30 mfd., 250 volts (C30)
31581	Cell—Bias cell
35632	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7, L18)
35631	Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
35623	Coil—Oscillator coil, "A" and "B" bands (L8, L9)
35619	Condenser—Variable tuning condenser (C10, C11)
37833	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 28" overall length)
34662	Cord—Indicator cord (approx. 53" overall length)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter bands oscillator coils
12006	Core—Adjustable core and stud for I.F. transformers
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
31580	Holder—Bias cell holder
5119	Plug—3 contact female plug for speaker cable
14404	Plug—7 prong plug for power input cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley, located between tuning knob and range switch shafts
30734	Resistor—5600 ohms, ¼ watt (R7)
30151	Resistor—18,000 ohms, 1 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ¼ watt (R9)
11988	Resistor—390,000 ohms, ¼ watt (R13)
30648	Resistor—470,000 ohms, ¼ watt (R11)
30161	Resistor—820,000 ohms, ¼ watt (R12)
30652	Resistor—1 megohm, ¼ watt (R1)
30162	Resistor—1.2 megohm, ¼ watt (R10)
30649	Resistor—2.2 megohm, ¼ watt (R3, R8)
14350	Screw—No. 8-32 square head set screw for drive drum
35633	Shaft—Range indicator shaft
35637	Shaft—Tuning knob shaft
35787	Socket—Phono-input socket
31251	Socket—Tube socket
31418	Spring—Indicator cord spring or drive cord spring
12007	Spring—Retaining spring for I.F. transformers' core and stud assemblies
31261	Spring—Retaining spring for oscillator coils core and stud assemblies
35621	Switch—Range switch (S1, S2, S3, S4)
33397	Switch—Tone control switch (S5)
37898	Transformer—Driver transformer (T1)
35636	Transformer—First I.F. transformer (L13, L14, C15, C18)
35628	Transformer—Second I.F. transformer (L15, L16, C20, C21)
37924	Transformer—Output transformer (T2)
33726	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft

REPLACEMENT PARTS LISTING CONTINUED

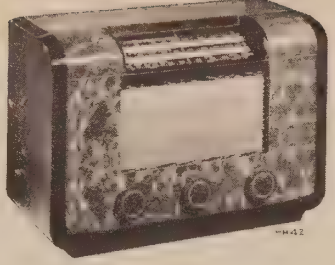
Replacement Parts (Continued)

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	QB13 (RC-612)
35622	Bracket—Mounting bracket for tuning knob shaft and flywheel
37976	Bracket—Tone control mounting bracket
35642	Calibrator—Drive drum calibrator scale
34654	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
12714	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)
35646	Capacitor—Ceramic, 6 mmf. (C36)
45465	Capacitor—Ceramic, 15 mmf. (C33)
36012	Capacitor—Ceramic, 15 mmf. (C37)
35644	Capacitor—Ceramic, 47 mmf. (C8, C12)
39622	Capacitor—Mica, 56 mmf. (C17)
70586	Capacitor—Mica, 68 mmf. (C9)
35645	Capacitor—Ceramic, 68 mmf. (C13)
39628	Capacitor—Mica, 100 mmf. (C29)
39634	Capacitor—Mica, 180 mmf. (C34)
39636	Capacitor—Mica, 220 mmf. (C16)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C23, C24)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C25, C26)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C39)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C35, C48)
71010	Capacitor—Tubular, .07 mfd., 400 volts (C22)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C28)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C46)
70619	Capacitor—Tubular, 0.5 mfd., 400 volts (C38)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C47)
37250	Capacitor—Electrolytic, 20 mfd., 250 volts (C32)
37867	Capacitor—Electrolytic, 30 mfd., 250 volts (C30)
35631	Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3)
35632	Coil—Antenna coil, "A" band, "B" band and 31 meter band (L4, L5, L6, L7, L18)
35623	Coil—Oscillator coil, "A" and "B" band (L8, L9)
35626	Coil—Oscillator coil, 31 meter band (L10)
35625	Coil—Oscillator coil, 25 meter band (L11)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35619	Condenser—Variable tuning condenser (C10, C11)
37833	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 30" overall length) NOTE: Before assembling, stretch to full length.
34662	Cord—Indicator cord (approx. 54" overall length) NOTE: Before assembling, stretch to full length.
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter band, 25 meter band or 31 meter band oscillator coils
12006	Core—Adjustable core and stud for I-F transformers
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
70930	Grommet—Rubber mounting grommet for tuning condenser (4 required)
5119	Plug—3 contact female plug for speaker cable
14404	Plug—7 prong plug for power input cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley, between tuning knob shaft and range switch shaft
8063	Resistor—330 ohms, ½ watt (R19)
30498	Resistor—390 ohms, ½ watt (R17)
30734	Resistor—5600 ohms, ¼ watt (R7)
30151	Resistor—18,000 ohms, 1 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ½ watt (R9, R18)
30648	Resistor—470,000 ohms, ¼ watt (R11)
30652	Resistor—1 megohm, ¼ watt (R1)
30162	Resistor—1.2 megohm, ¼ watt (R10)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ½ watt (R8)
14350	Screw—No. 8-32 square head set screw for drive drum
35633	Shaft—Range switch indicator shaft
35637	Shaft—Tuning knob shaft
35787	Socket—Phono input socket
36500	Socket—Tube socket, miniature
31251	Socket—Tube socket
72679	Socket—Tube socket, cushion mounted
12007	Spring—Retaining spring for I-F transformers core and stud assemblies
31261	Spring—Retaining spring for oscillator coils, core and studs assemblies
31418	Spring—Tension spring for drive cord or indicator cord
35640	Support—Drive pulley support complete with one pulley
35639	Support—Drive pulley support complete with three (3) pulleys
35621	Switch—Range switch (S1, S2, S3, S4)
33397	Switch—Tone control switch (S5)
37898	Transformer—Driver transformer (T1)
72835	Transformer—Output transformer (T2)
35636	Transformer—First I. F. transformer (T4, L13, L14, C15, C18)
35628	Transformer—Second I. F. transformer (T5, L15, L16, C20, C21)
33726	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft
	VIBRATOR POWER SUPPLY **RS-115**
4289	Body—Fuse connector body
4288	Cap—Fuse connector cap
39644	Capacitor—Mica, 470 mmf. (C42, C44)
71008	Capacitor—Tubular, .008 mfd., 1200 volts (C43)
70641	Capacitor—Tubular, .01 mfd., 1000 volts (C40)
37877	Capacitor—Electrolytic, 16 mfd., 350 volts (C41)
37834	Case—Power supply case less cover
14289	Clip—Battery clips (1 set)
37925	Coil—Choke coil (L21)
37836	Cover—Power supply case cover
4286	Ferrule—Fuse connector ferrule and bushing
5140	Fuse—5 ampere
4290	Insulator—Fuse connector insulator
14409	Plug—7 contact female plug for power supply cable
34765	Resistor—100 ohms, ¼ watt (R15)
38896	Resistor—1200 ohms, 1 watt (R14)
71991	Resistor—2200 ohms, 1 watt (R16)
12241	Socket—Vibrator socket
4284	Spring—Fuse connector spring
35544	Transformer—Vibrator transformer (T3, C45, L22)
35543	Vibrator—Plug-in vibrator
4285	Washer—Fuse connector insulating washer
	SPEAKER ASSEMBLIES **92519-1**
70578	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker cable
70577	Speaker—6½" P.M. speaker complete with cone and voice coil less plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70833	Board—Baffle board and grille for QB12 & QB13
Y1382	Cabinet—Plastic cabinet for QB12 & QB13
71089	Decal—Trademark decal for QB12 & QB13
70579	Decal—Trademark decal for QB11
35654	Dial—Glass dial scale
36658	Extension—Tune control shaft extension for QB11
37838	Frame—Dial frame assembly less indicator
X1611	Grille—Cabinet grille cloth for Model QB11
37396	Grommet—Rubber grommet for mounting speaker (4 required) for QB12 & QB13
70839	Grommet—Rubber grommet for mounting chassis (4 required) for QB12 & QB13
70580	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob for QB11
70663	Knob—Tuning or volume control knob for QB12 & QB13
14270	Spring—Retaining spring for tone control, volume control, range switch or tuning knob
4982	Spring—Retaining spring for range indicator knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model Q22A



Model Q32

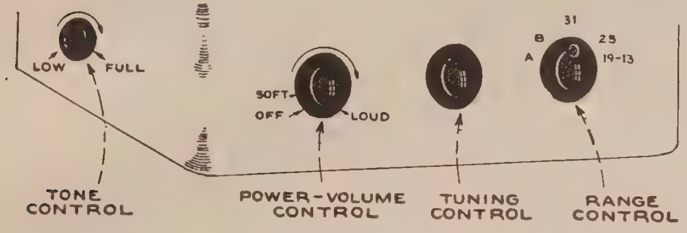
RCA MODELS Q22A & Q32

Chassis No. RC-507—Mfr. No. 274

Service Data

1945 • • • • X1A

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.


LOW
FULL
SOFT
OFF
LOUD
31
B
25
A
19-13
TONE CONTROL
POWER-VOLUME CONTROL
TUNING CONTROL
RANGE CONTROL

Location of Controls

Electrical and Mechanical Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SA7	1st Detector-Oscillator
(2) RCA-6SK7	I-F Amplifier
(3) RCA-6SQ7	2nd Detector, A-F Amplifier, A.V.C.
(4) RCA-6AD7-G	Phase Inverter, Power Output
(5) RCA-6F6-G	Power Output
(6) RCA-5Y3-GT	Rectifier

Power Output Rating

Undistorted	3 watts
Maximum	3.5 watts

Loudspeaker

Model	92517-1
Type (Electrodynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms

Cabinet Dimensions (Inches)

	Height	Width	Depth
Q22A (Plastic)	10⅝	15⅞	7⅝
Q32 (Wood)	11⅝	17$\frac{3}{16}$	7½

Net Weight (pounds)	21
Shipping Weight (pounds)	25
Chassis Base Dimensions (inches)	Height, 2¾; Width, 15⅛; Depth, 5¼
Over-all Chassis Height	9¼ inches
Tuning Drive Ratio	25 to 1

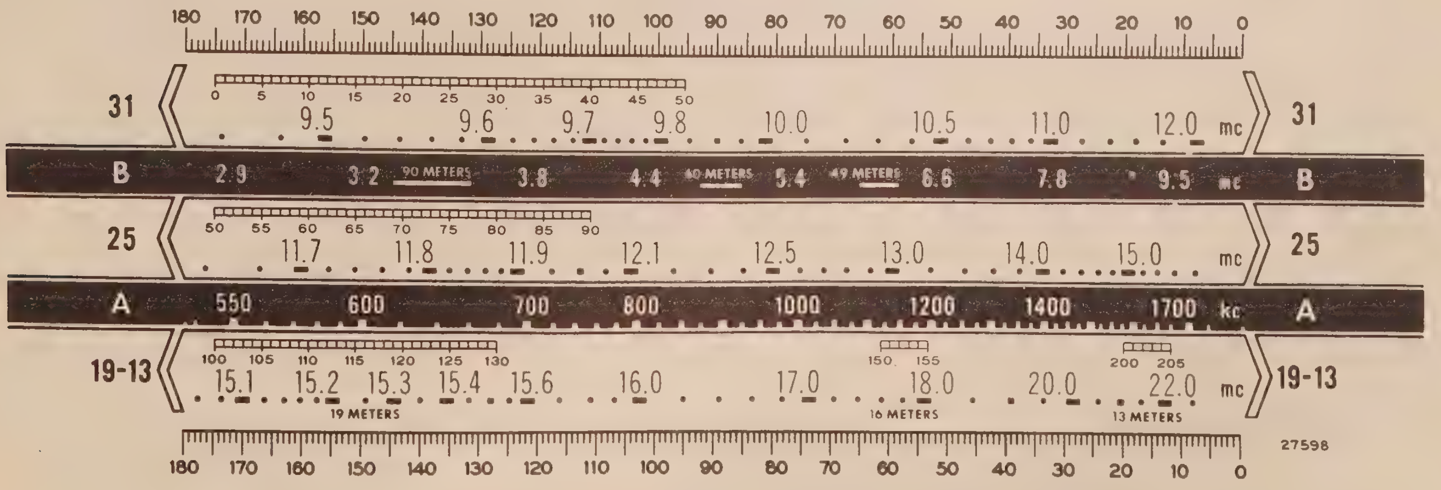
Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125 volts, 117 nominal	50-60	65
Rating B	105-125 volts, 117 nominal	25-60	65
Rating C	105-125 volts, 117 nominal 210-250 volts, 234 nominal	50-60	65
	(Shipped in 210-250 volt position)		

Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Victrola is not in use its plug should be removed. When Victrola is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

Calibration Scale


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
31
0 5 10 15 20 25 30 35 40 45 50
9.5 9.6 9.7 9.8 10.0 10.5 11.0 12.0 mc
B
2.9 3.2 90 METERS 3.8 4.4 60 METERS 5.4 49 METERS 6.6 7.8 9.5 mc
25
50 55 60 65 70 75 80 85 90
11.7 11.8 11.9 12.1 12.5 13.0 14.0 15.0 mc
A
550 600 700 800 1000 1200 1400 1700 kc
19-13
100 105 110 115 120 125 130
150 155
200 205
15.1 15.2 15.3 15.4 15.6 16.0 17.0 18.0 20.0 22.0 mc
19 METERS
16 METERS
13 METERS
27598

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

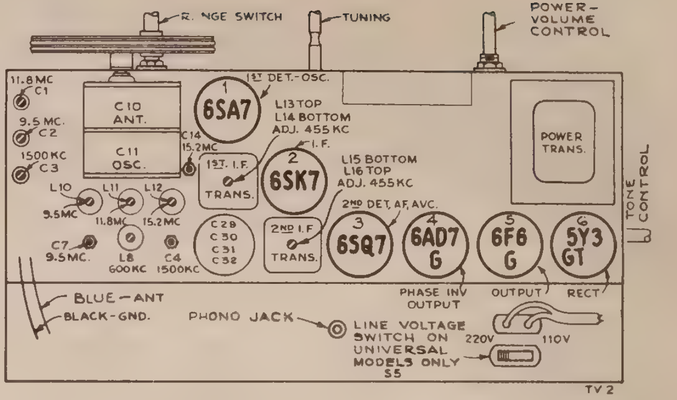
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for **spread-band alignment**, a final check should be made on actual reception of **short-wave stations** of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."


RANGE SWITCH
TUNING
POWER-VOLUME CONTROL
11.8 MC C1
9.5 MC. C2
1500 KC C3
C10 ANT.
C11 OSC.
C14 15.2MC
1ST DET.-OSC.
6SA7
L13 TOP
L14 BOTTOM
ADJ. 455 KC
1ST I.F. TRANS.
6SK7
L15 BOTTOM
L16 TOP
ADJ. 455KC
POWER TRANS.
TONE CONTROL
L10 9.5MC
L11 11.8MC
L12 15.2MC
C28 C30 C31 C32
2ND I.F. TRANS.
2ND DET. AF. AVC.
6SQ7
6AD7 G
6F6 G
5Y3 GT
C7 9.5MC.
L8 600KC
C4 1500KC
BLUE—ANT
BLACK-GND.
PHONO JACK
PHASE INV OUTPUT
OUTPUT
RECT
LINE VOLTAGE SWITCH ON UNIVERSAL MODELS ONLY S5
220V
110V
TV 2

Tube and Trimmer Locations

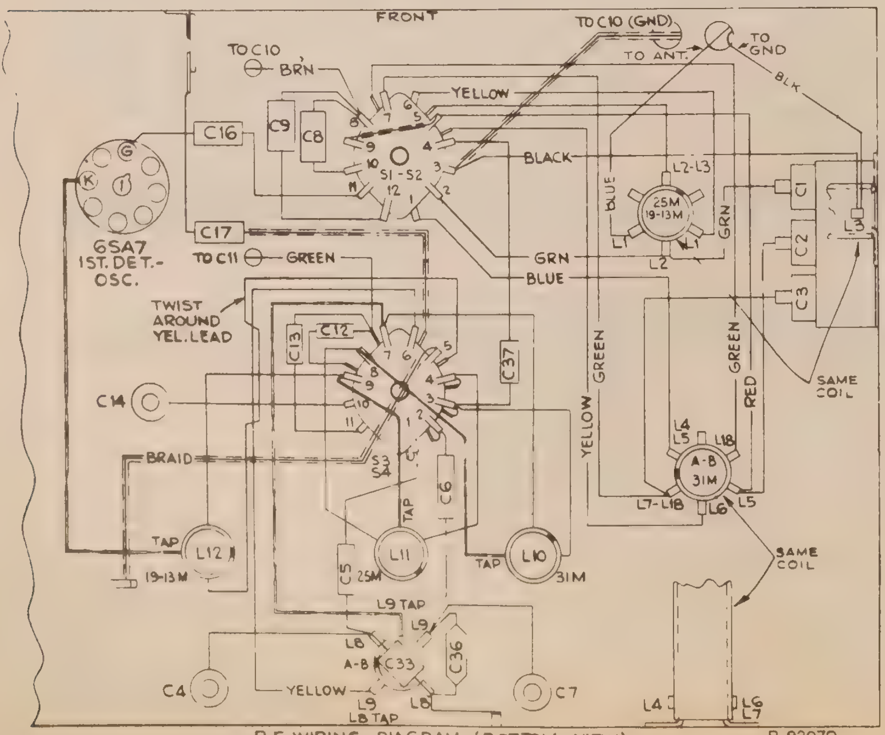
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L15 and L16 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25 M	138.5°	L11 (osc.)** C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13 M	156°	L12 (osc.)**
7		9.5 mc	31 M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

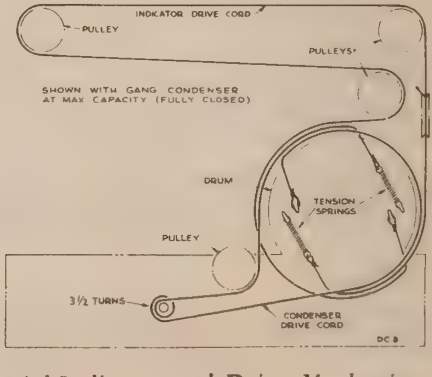
** If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

*** Peak at minimum capacity if two peaks can be obtained.

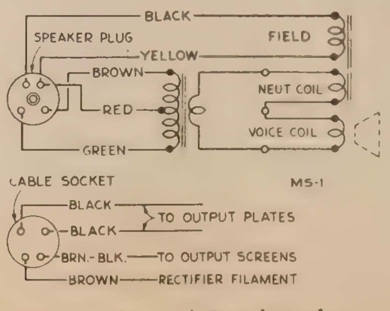
NOTE: Oscillator tracks above signal on all bands.


FRONT
TO C10 (GND)
TO ANT.
TO GND
BLK
TO C10
BRN
YELLOW
C16
C9
C8
S1-S2
BLACK
L2-L3
BLUE
25M 19-13M
GRN
L1
L2
C1
C2
C3
L3
6SA7 1ST. DET.-OSC.
C17
TO C11
GREEN
GRN
BLUE
TWIST AROUND YEL. LEAD
C13
C12
C37
YELLOW
GREEN
GREEN
RED
SAME COIL
C14
BRAID
S3 S4
TAP
C6
L4
L5
L18
A-B 31M
L7-L18
L6
L5
TAP
L12
19-13M
C5
25M
L11
L10
31M
SAME COIL
L9 TAP
L9
L8
A-B
C33
C36
C4
YELLOW
L9
L8
L8 TAP
C7
L4
L6 L7

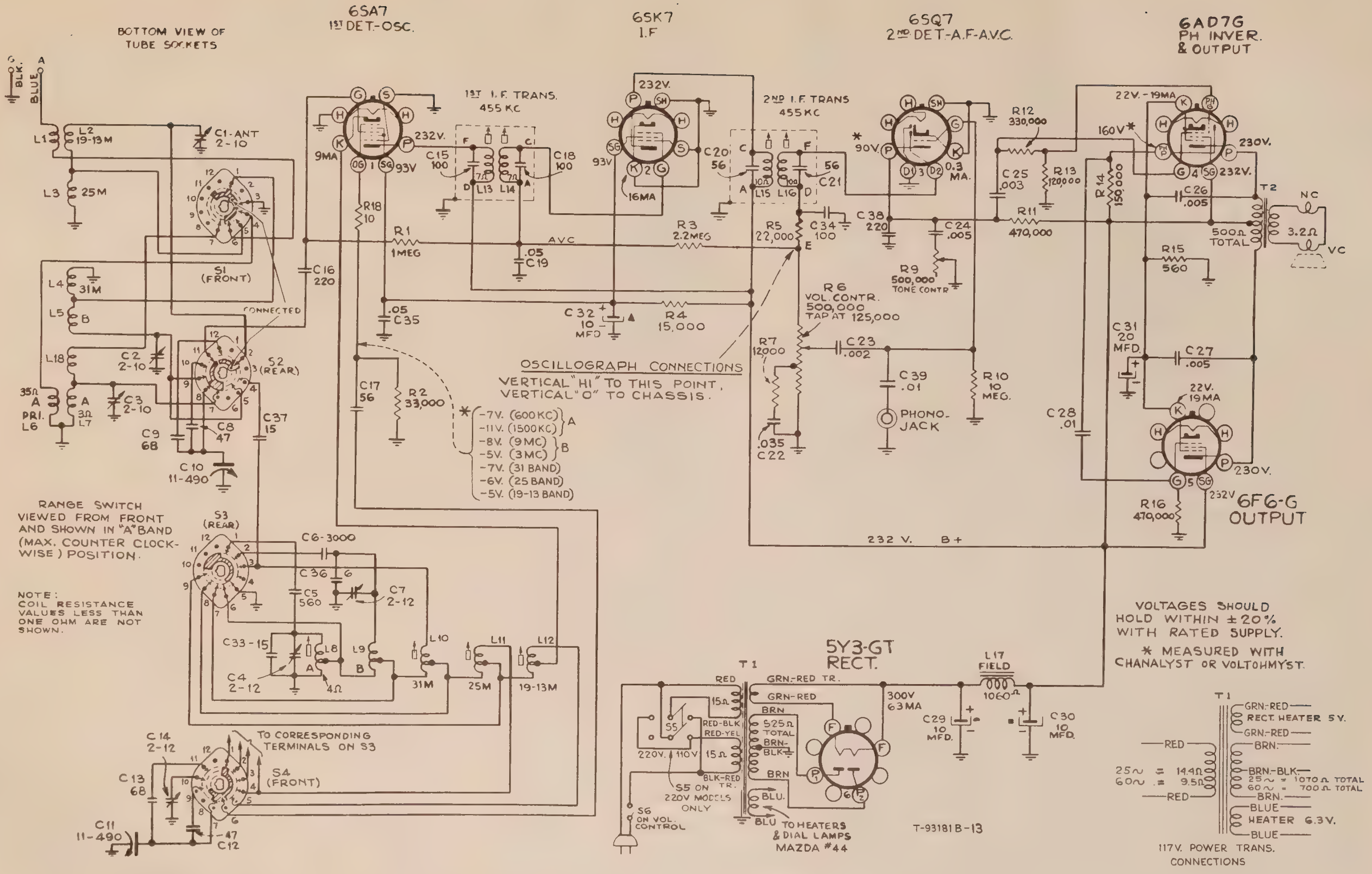
R.F. WIRING DIAGRAM (BOTTOM VIEW) P-92070


INDICATOR DRIVE CORD
PULLEY
PULLEYS
SHOWN WITH GANG CONDENSER AT MAX CAPACITY (FULLY CLOSED)
DRUM
TENSION SPRINGS
PULLEY
3½ TURNS
CONDENSER DRIVE CORD
DC 8

Dial-Indicator and Drive Mechanism


BLACK
SPEAKER PLUG
FIELD
YELLOW
BROWN
NEUT COIL
RED
VOICE COIL
GREEN
CABLE SOCKET
MS-1
BLACK
TO OUTPUT PLATES
BLACK
BRN.-BLK.
TO OUTPUT SCREENS
BROWN
RECTIFIER FILAMENT

Connections and Colors of Loudspeaker and Cable


BOTTOM VIEW OF TUBE SOCKETS
6SA7 1ST DET-OSC.
6SK7 I.F
6SQ7 2ND DET-A.F-A.V.C.
6AD7G PH INVER. & OUTPUT
1ST I.F. TRANS. 455 KC
2ND I.F TRANS 455 KC
6F6-G OUTPUT
5Y3-GT RECT.
OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
-7V. (600KC), -11V. (1500KC) A
-8V. (9MC), -5V. (3MC) B
-7V. (31 BAND)
-6V. (25 BAND)
-5V. (19-13 BAND)
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCK-WISE) POSITION.
NOTE: COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
TO CORRESPONDING TERMINALS ON S3
R6 VOL. CONTR. 500,000 TAP AT 125,000
R9 500,000 TONE CONTR
PHONO. JACK
232 V. B+
VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
S5 ON 220V MODELS ONLY
S6 ON VOL. CONTROL
TO HEATERS & DIAL LAMPS MAZDA #44
T-93181B-13
117V. POWER TRANS. CONNECTIONS
RECT. HEATER 5V.
HEATER 6.3V.
25~ = 14.4Ω, 60~ = 9.5Ω
25~ = 1070Ω TOTAL, 60~ = 700Ω TOTAL
L17 FIELD 1060Ω

Schematic Circuit Diagram

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F transformer should be dressed under other leads and against chassis.

NOTE.—On some sets C23 may be .0015 mf., C25 may be .0025 mf.

Loudspeaker.—

To center the loudspeaker voice coil, first remove the dust cover. Then loosen the center suspension by thoroughly soaking the outer edge of this suspension with repeated applications of acetone.

(Caution: Keep acetone from flowing to other parts of the loudspeaker.)

Keep the outer edge of the suspension soaked, and lift the cone, near the voice coil, up and down until the suspension is pulled away from the cone housing.

Insert 3 feelers, equally spaced, between the voice coil and the pole piece, and allow the center suspension to re-cement itself. Additional cement should be applied if necessary. Remove feelers when cement has hardened completely.

Service Hint:

If minimum volume is too high, it may be reduced by dressing the yellow lead from hot side of volume control (R6) away from the grid coupling capacitor (C23).

Replacement Parts

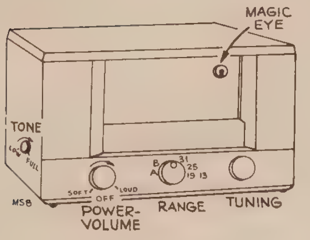
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-507
35640	Bracket—Drive cord pulley bracket complete with one (1) pulley
35639	Bracket—Drive cord pulley bracket complete with three (3) pulleys
35622	Bracket—Flywheel support bracket
37976	Bracket—Tone control support bracket
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer (2-12 mmf.) (C4, C7, C14)
33014	Capacitor—Electrolytic, consisting of three (3) sections of 10 mfd., 450 volts, and one (1) section of 20 mfd., 25 volts (C29, C30, C31, C32)
34654	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
35646	Capacitor—Ceramic, 6 mmf. (C36)
36012	Capacitor—Ceramic, 15 mmf. (C37)
45465	Capacitor—Ceramic, 15 mmf. (C33)
70582	Capacitor—Ceramic, 47 mmf. (C8)
35644	Capacitor—Ceramic, 47 mmf. (C12)
39622	Capacitor—Mica, 56 mmf. (C17)
39632	Capacitor—Mica, 56 mmf. (C20, C21)
70586	Capacitor—Mica, 68 mmf. (C9)
35645	Capacitor—Ceramic, 68 mmf. (C13)
39628	Capacitor—Mica, 100 mmf. (C15, C18, C34)
39636	Capacitor—Mica, 220 mmf. (C16, C38)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70601	Capacitor—Tubular, .002 mfd., 200 volts (C23)
70624	Capacitor—Tubular, .003 mfd., 600 volts (C25)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C24)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C26, C27)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C39)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C28)
70614	Capacitor—Tubular, .035 mfd., 200 volts (C22)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C19)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C35)
35631	Coil—Antenna coil, 19-13 meter and 25 meter bands (L1, L2, L3)
35632	Coil—Antenna coil, "A," "B" and 31 meter bands (L4, L5, L6, L7, L18)
35623	Coil—Oscillator coil, "A" and "B" bands (L8, L9)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
35619	Condenser—Variable tuning condenser (C10, C11)
35629	Control—Tone control (R9)
35620	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 28 inches overall length)
34662	Cord—Indicator cord (approx. 53 inches overall length)
12006	Core—Adjustable core and stud assemblies for I-F transformers
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter oscillator coil
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
5040	Plug—4 contact female plug for speaker cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley located between the range switch and tuning knob shafts
34761	Resistor—10 ohms, ¼ watt (R18)
30735	Resistor—560 ohms, 1 watt (R15)
30436	Resistor—12,000 ohms, ¼ watt (R7)
35595	Resistor—15,000 ohms, 3 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ¼ watt (R13)
30493	Resistor—150,000 ohms, ½ watt (R14)
14983	Resistor—330,000 ohms, ¼ watt (R12)
30648	Resistor—470,000 ohms, ½ watt (R11, R16)
30652	Resistor—1 megohm, ¼ watt (R1)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R10)
14350	Screw—#8-32 square head set screw for drive drum
35633	Shaft—Range switch indicator knob shaft
35637	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
14278	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord or indicator cord spring.
12007	Spring—Retaining spring for I-F transformers' core and stud assemblies
31261	Spring—Retaining spring for oscillator coils' core and stud assemblies
35621	Switch—Range switch (S1, S2, S3, S4)
32827	Switch—Voltage switch (S5)
35636	Transformer—First I-F transformer (L13, L14, C15, C18)
35628	Transformer—Second I-F transformer (L15, L16, C20, C21)
32852	Transformer—Power transformer, 105-125 volts, 50/60 cycle or 105-125/210-250 volts, 50/60 cycle (T1)
35588	Transformer—Power transformer, 105-125 volts, 25/60 cycle (T1)
33726	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	STAMPED 92517-1J
70578	Cone—Cone and voice coil assembly
5118	Plug—4-prong male plug for speaker
70583	Speaker—6½-inch E.M. speaker complete with cone and voice coil less plug and output transformer
70584	Transformer—Output transformer (T2)
	Note: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
35649	Back—Cabinet back for Q22A
	Back—Cabinet back for Q32
70579	Decal—Trade mark decal
35654	Dial—Glass dial scale
36658	Extension—Tone control shaft extension for Q32
35647	Frame—Dial frame complete less indicator
70581	Grille—Grille cloth for Q22A
X1611	Grille—Grille cloth for Q32
70580	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob
11891	Lamp—Dial lamp (Mazda No. 44)
14270	Spring—Retaining spring for tone control, volume control, range switch and tuning knobs
4982	Spring—Retaining spring for range indicator knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List under Miscellaneous Assemblies:

Stock No. 71083—Back—Cabinet back for Model Q32.

Model Q34


MAGIC EYE
TONE
POWER-VOLUME
RANGE
TUNING
OFF
SOFT
LOUD
MSB

Location of Controls

RCA MODEL Q34

Chassis No. RC-539E — Mfr. No. 274

Service Data

1945 · · · · X2

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SK7	R-F Amplifier
(2) RCA-6SA7	1st Detector-Oscillator
(3) RCA-6SK7	I-F Amplifier
(4) RCA-6SQ7	2nd Det. A-F Amplifier A.V.C.
(5) RCA-6AD7G	Phase Inverter and Power Output
(6) RCA-6F6G	Power Output
(7) RCA-6U5/6G5	Tuning Indicator
(8) RCA-5Y3GT	Rectifier

Pilot Lamps .... 2—Type 44, 6.3 volts, 0.25 amps.

Power Supply Ratings

105-125 volts, 117 nominal, 50-60 cycles	80 watts
105-125 volts, 117 nominal, 25-60 cycles	80 watts
100-115 volts, 110 nominal—115-135 v, 125 nominal 135-165 volts, 150 nominal—190-230 v, 210 nominal 220-260 volts, 240 nominal—50-60 cycles (shipped in 240 volt position)	80 watts

Power Output

Undistorted	3.25 watts
Maximum	4.5 watts

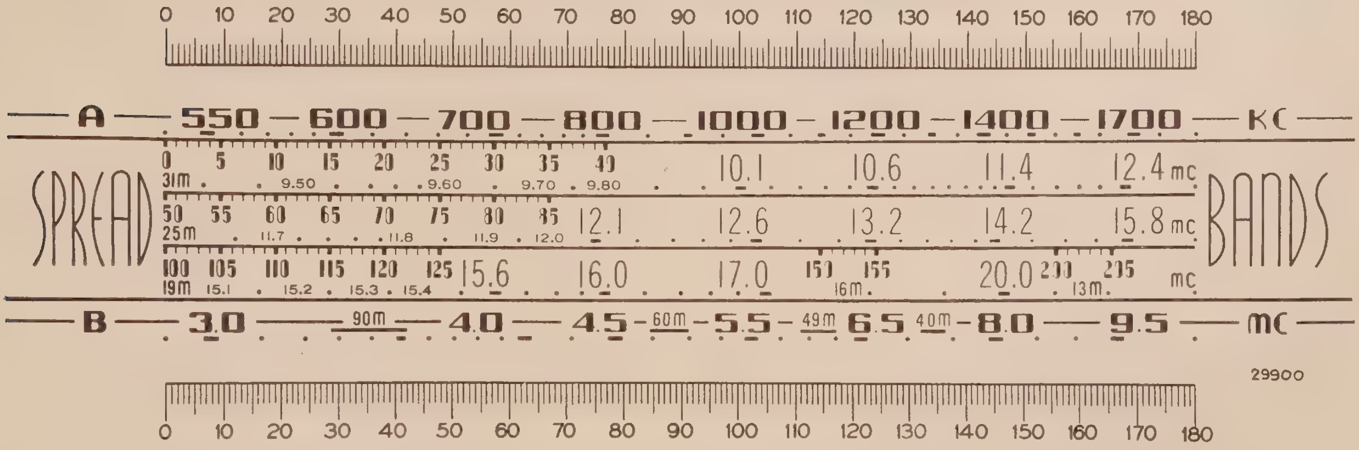
Loudspeaker

Type	6" x 9" electrodynamic
V.C. Impedance	2.2 ohms at 400 cycles
Identification Number	92562-1J

	Height	Width	Depth
Cabinet Dimensions (inches)	13⅝	21½	10⁹⁄₁₆
Chassis Base Dimensions (inches)	2⅞	15½	6½

Overall Chassis Height	7¹³⁄₁₆ inches
Weight	34 lbs. (net) .... 42 lbs. (gross)
Tuning Drive Ratio	25 to 1

RECEIVER DIAL WITH CALIBRATION SCALE


0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
A 550 600 700 800 1000 1200 1400 1700 KC
SPREAD
BANDS
31m 9.50 9.60 9.70 9.80 10.1 10.6 11.4 12.4 mc
25m 11.7 11.8 11.9 12.0 12.1 12.6 13.2 14.2 15.8 mc
19m 15.1 15.2 15.3 15.4 15.6 16.0 17.0 16m 20.0 13m mc
B 3.0 90m 4.0 4.5 60m 5.5 49m 6.5 40m 8.0 9.5 mc
29900
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 30° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Q34 Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

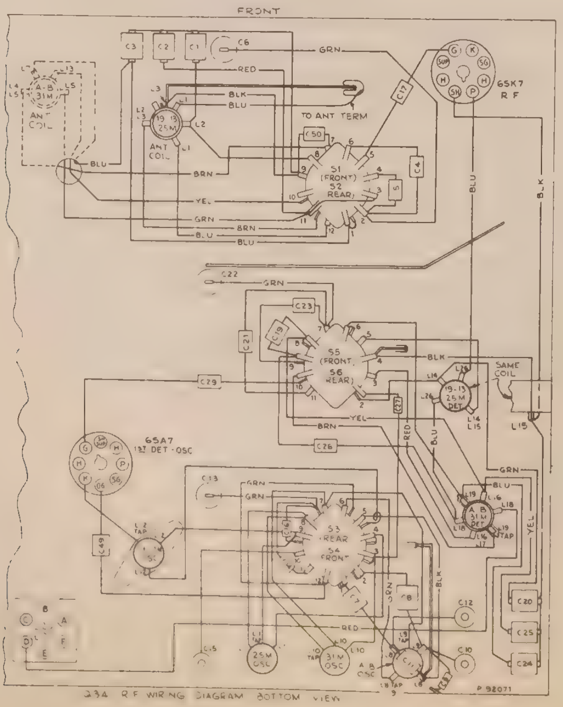
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

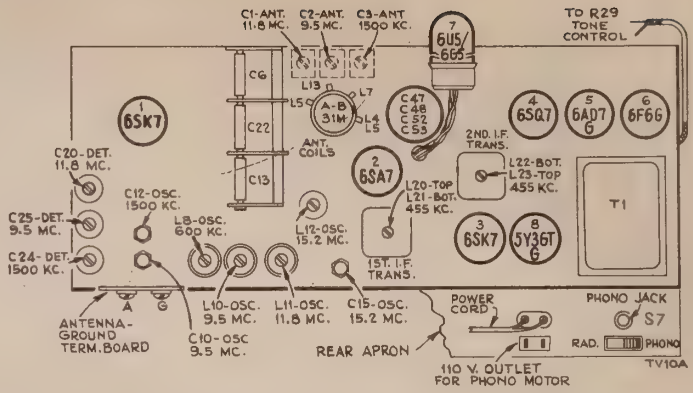
VICTROLA ATTACHMENT.—A jack is provided on the rear of chassis for connecting a Victrola Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug. A 110-volt outlet for Victrola motor is available on back of the chassis.

For Radio reception, the Radio-Phono switch (S7) should be placed in the Radio position.

When Victrola is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.


FRONT
C3
C2
C1
C6
GRN
RED
BLK
BLU
TO ANT TERM
A-B 31M
ANT COIL
19-13 25M
ANT COIL
C50
C17
C4
C5
S1 (FRONT) S2 REAR
BRN
YEL
GRN
BRN
BLU
BLU
6SK7 R F
C22
C23
C19
C21
S5 (FRONT) S6 REAR
C29
C27
C26
SAME COIL
19-13 25M DET
L14 L15
L15
6SA7 1ST DET-OSC
C13
C49
S3 REAR S4 FRONT
A B 31M DET
C8
C12
C10
C20
C25
C24
25M OSC
31M OSC
A B OSC
P 92071

Q34 R.F. WIRING DIAGRAM BOTTOM VIEW


C1-ANT. 11.8 MC.
C2-ANT. 9.5 MC.
C3-ANT 1500 KC.
7 6U5/6G5
TO R29 TONE CONTROL
C6
C22
C13
L13
L5
L7
A-B 31M
L4 L5
ANT. COILS
C47 C48 C52 C53
1 6SK7
4 6SQ7
5 6AD7 G
6 6F6G
C20-DET. 11.8 MC.
C25-DET. 9.5 MC.
C24-DET. 1500 KC.
C12-OSC. 1500 KC.
L8-OSC. 600 KC.
L12-OSC. 15.2 MC.
2 6SA7
L20-TOP L21-BOT. 455 KC.
2ND. I.F. TRANS.
L22-BOT. L23-TOP 455 KC.
T1
1ST. I.F. TRANS.
3 6SK7
8 5Y3GT G
A
G
ANTENNA-GROUND TERM.BOARD
C10-OSC 9.5 MC.
L10-OSC. 9.5 MC.
L11-OSC. 11.8 MC.
C15-OSC. 15.2 MC.
REAR APRON
POWER CORD
PHONO JACK
S7
RAD.
PHONO
110 V. OUTLET FOR PHONO MOTOR
TV10A

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L23-L22 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L21-L20 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (41.5°)	L11 (osc.) C1 (ant.) C20 (det.)
4		15.2 mc		15.2 mc (161.7°)	C15 (osc.)*† Rock in
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (24°)	L12 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (23.8°)	L10 (osc.)** C2 (ant.) C25 (det.)***
8		9.5 mc	"B" band	9.5 mc (168.5°)	C10 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (153°)	C12 (osc.) C3 (ant.) C24 (det.)
10		600 kc		600 kc (30.5°)	L8 (osc.) Rock in
11	Repeat steps 9 and 10.				

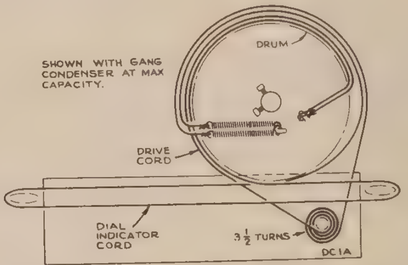
* Use minimum capacity peak if two can be obtained.

** If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

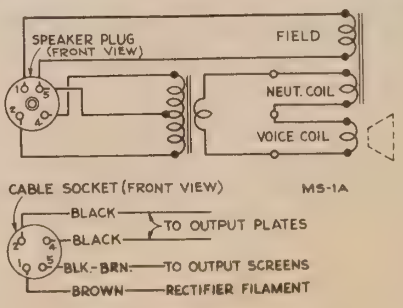
*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C15 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc (147°) where a weaker signal should be received.

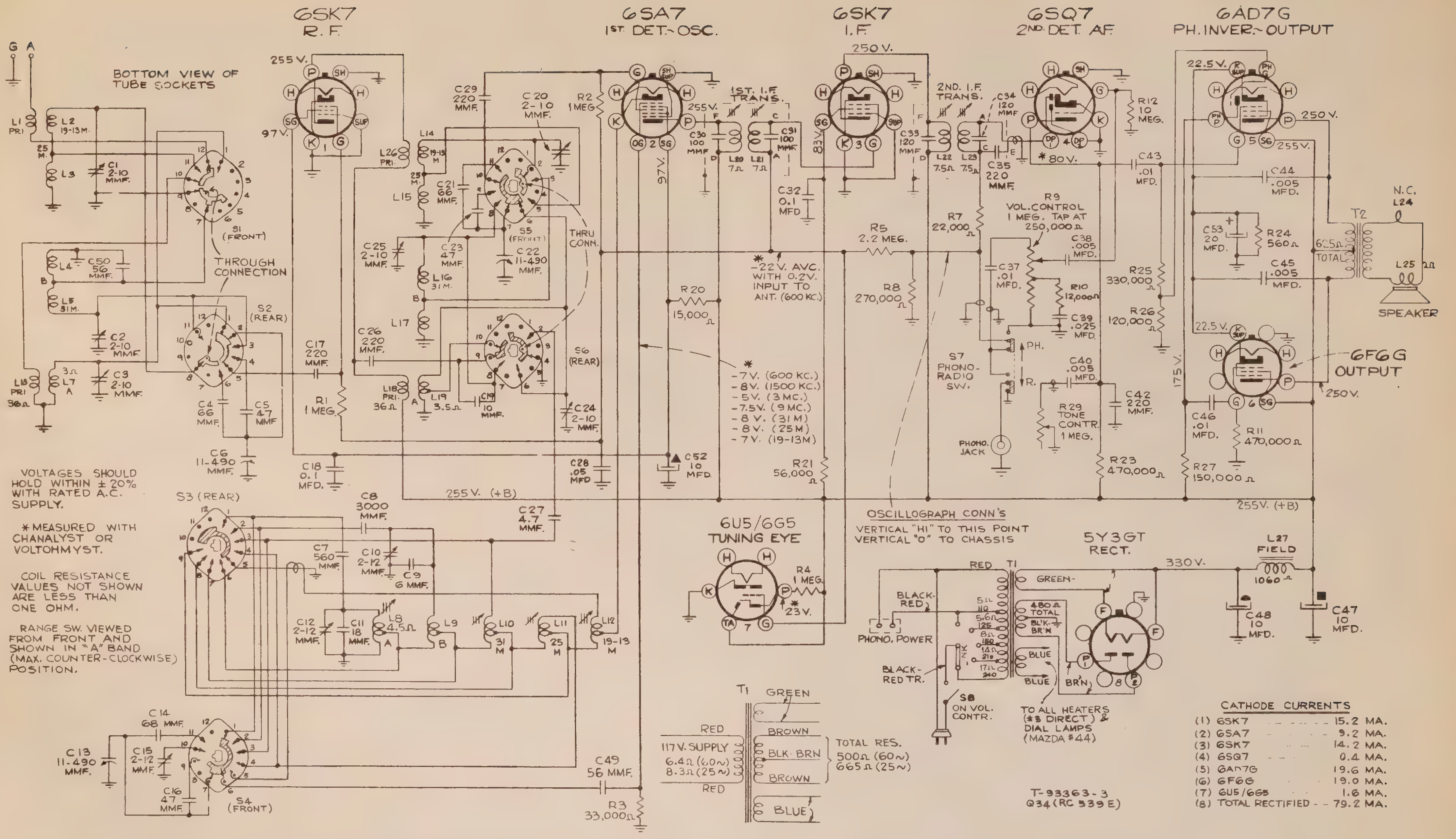
NOTE: Oscillator tracks above signals on all bands.


SHOWN WITH GANG CONDENSER AT MAX CAPACITY.
DRUM
DRIVE CORD
DIAL INDICATOR CORD
3½ TURNS
DC1A

Dial-Indicator and Drive Mechanism


SPEAKER PLUG (FRONT VIEW)
FIELD
NEUT. COIL
VOICE COIL
CABLE SOCKET (FRONT VIEW)
MS-1A
BLACK
BLACK
TO OUTPUT PLATES
BLK.-BRN.
TO OUTPUT SCREENS
BROWN
RECTIFIER FILAMENT

Loudspeaker Connections


6SK7
R.F.
6SA7
1ST DET.-OSC.
6SK7
I.F.
6SQ7
2ND DET. AF.
6AD7G
PH. INVER.-OUTPUT
6F6G
OUTPUT
6U5/6G5
TUNING EYE
5Y3GT
RECT.
BOTTOM VIEW OF TUBE SOCKETS
THROUGH CONNECTION
THRU CONN.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
S1 (FRONT)
S2 (REAR)
S3 (REAR)
S4 (FRONT)
S5 (FRONT)
S6 (REAR)
S7 PHONO-RADIO SW.
S8 ON VOL. CONTR.
PHONO. JACK
PHONO. POWER
SPEAKER
T1
T2
L27 FIELD 1060Ω
255V. (+B)
330V.
-22V. AVC. WITH 0.2V. INPUT TO ANT. (600 KC.)
-7V. (600 KC.)
-8V. (1500 KC.)
-5V. (3 MC.)
-7.5V. (9 MC.)
-8 V. (31 M)
-8 V. (25 M)
-7 V. (19-13 M)
OSCILLOGRAPH CONN'S
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS
TO ALL HEATERS (#3 DIRECT) & DIAL LAMPS (MAZDA #44)
117V. SUPPLY 6.4Ω (60~) 8.3Ω (25~)
TOTAL RES. 500Ω (60~) 665Ω (25~)
R9 VOL. CONTROL 1 MEG. TAP AT 250,000Ω
R29 TONE CONTR. 1 MEG.
T-93363-3
Q34 (RC 539 E)

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED A.C. SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST.

COIL RESISTANCE VALUES NOT SHOWN ARE LESS THAN ONE OHM.

RANGE SW. VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER-CLOCKWISE) POSITION.

CATHODE CURRENTS

(1)	6SK7	15.2 MA.
(2)	6SA7	9.2 MA.
(3)	6SK7	14.2 MA.
(4)	6SQ7	0.4 MA.
(5)	6AD7G	19.6 MA.
(6)	6F6G	19.0 MA.
(7)	6U5/6G5	1.6 MA.
(8)	TOTAL RECTIFIED	79.2 MA.

Schematic Circuit Diagram

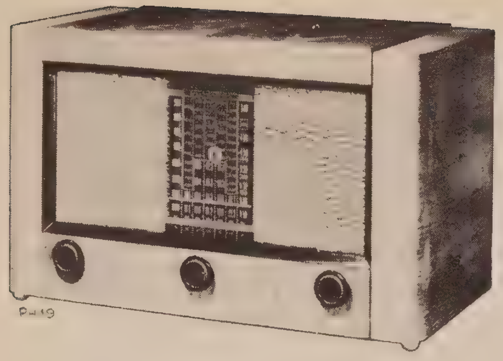
PRECAUTIONARY LEAD DRESS

1. Dress green leads from antenna and R-F sections of the gang condenser away from all metal including chassis shield plates. The spaghetti-covered braid in the antenna section should be at least 1/4 inch away from the gang.
2. Black and brown twisted filament leads between 6SA7 (1st Det.-Osc.) and 6SK7 (R-F) must run along front side of shield plate.
3. Dress mica capacitors and switch leads away from shield plates. Turn flat sides of capacitors away from shield plates.
4. Closely twist the leads from terminals E and A of the second I F transformer, and dress them close to the chassis.
5. Dress volume control-arm lead and capacitor (C38) close to front apron and away from output tube bypass capacitors (C44 and C45).
6. 6SQ7 10 megohm grid resistor (R12) should have minimum lead length on the grid side.
7. Dress the capacitor (C37) on the high side of the volume control as far as possible from a-c switch.
8. Leads to 6SA7 socket must not impede flexible mounting.
9. The 6SA7 control grid must be clear of any other leads, especially filament leads which must be at least 1/4 inch away. The 1 megohm grid resistor (R2) must have its body as close to the grid terminal as possible.
10. Dress 6SA7 control grid capacitor (C49) away from the coil form (L12), away from the oscillator grid capacitor (C29), and 1/4 inch away from any other part.
11. 6AD7G plate to cathode capacitor (C44) must be flat against chassis.
12. Dress all filament and B+ leads close to the chassis.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC 539E)
34502	Arm—Range switch actuating arm
37053	Board—"Antenna-Ground" board
39857	Bracket—L.H. bracket complete with drive cord pulley
39856	Bracket—R.H. bracket complete with drive cord pulley
37092	Calibrator—Drive drum calibrator
33014	Capacitor—Electrolytic, comprising three (3) sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C47, C48, C52, C53)
37059	Capacitor—Mica trimmer, triple 2.5-10 mmf. (C1, C2, C3, C20, C24, C25)
33097	Capacitor—Ceramic, 4.7 mmf. (C27)
12714	Capacitor—Air trimmer, 2-12 mmf. (C10, C12, C15)
35646	Capacitor—Ceramic, 6 mmf. (C9)
39604	Capacitor—Mica, 10 mmf. (C19)
39041	Capacitor—Ceramic, 18 mmf. (C11)
35644	Capacitor—Ceramic, 47 mmf. (C16)
70582	Capacitor—Ceramic, 47 mmf. (C5, C23)
39622	Capacitor—Mica, 56 mmf. (C49, C50)
36072	Capacitor—Mica, 66 mmf. (C4, C21)
35645	Capacitor—Ceramic, 68 mmf. (C14)
39628	Capacitor—Mica, 100 mmf. (C30, C31)
39630	Capacitor—Mica, 120 mmf. (C33, C34)
39636	Capacitor—Mica, 220 mmf. (C17, C26, C29, C35, C42)
39626	Capacitor—Mica, 560 mmf. (C7)
70687	Capacitor—Mica, 3000 mmf. (C8)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C44, C45)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C38)
70527	Capacitor—Tubular, .005 mfd., 600 volts (C40)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C37)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C43, C46)
70612	Capacitor—Tubular, .025 mfd., 200 volts (C39)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C28)
70638	Capacitor—Tubular, .1 mfd., 600 volts (C18, C32)
37055	Coil—Antenna coil, A, B and 31 meter band (L4, L5, L7, L13)
37056	Coil—Antenna coil, 19-13 meter and 25 meter bands (L1, L2, L3)
37057	Coil—R-F coil, A, B and 31 meter bands (L16, L17, L18, L19)
37058	Coil—R-F coil, 19-13 meter and 25 meter bands (L14, L15, L26)
35624	Coil—Oscillator coil, 19-13 meter (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
37093	Coil—Oscillator coil, A & B band (L8, L9)
37151	Condenser—Variable tuning condenser (C6, C13, C22)
36109	Control—Tone control (R29)
37087	Control—Volume control and power switch (R9, S8)
32634	Cord—Drive cord (approx. 41 inches overall length)
32634	Cord—Indicator cord (approx. 42 inches overall length)
35788	Core—Adjustable core and stud for A & B band oscillator coil
12006	Core—Adjustable core and stud for I-F transformers
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter band oscillator coils
37090	Drum—Drive drum
37094	Link—Link, arm and bushing assembly
5040	Plug—5 contact female plug for speaker cable
35641	Pulley—Drive cord pulley
36637	Receptacle—A-C power receptacle
30735	Resistor—560 ohms, 1 watt (R24)
30436	Resistor—12,000 ohms, ¼ watt (R10)
35595	Resistor—15,000 ohms, 3 watt (R20)
30492	Resistor—22,000 ohms, ¼ watt (R7)
30685	Resistor—33,000 ohms, ¼ watt (R3)
30650	Resistor—56,000 ohms, ½ watt (R21)
13734	Resistor—120,000 ohms, ¼ watt (R26)
30493	Resistor—150,000 ohms, ½ watt (R27)
30651	Resistor—270,000 ohms, ¼ watt (R8)
14983	Resistor—330,000 ohms, ¼ watt (R25)
30648	Resistor—470,000 ohms, ½ watt (R11, R23)
30652	Resistor—1 megohm, ¼ watt (R1, R2, R4)
30649	Resistor—2.2 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R12)
14350	Screw—#8-32 square head set screw for Arm #34502 and link #37094
4669	Screw—#8-32 square head set screw for drive drum
37096	Shaft—Range indicator knob shaft
37095	Shaft—Range switch actuating shaft
37091	Shaft—Tuning knob shaft and flywheel
31364	Socket—Dial lamp socket
35787	Socket—Phono input socket
31251	Socket—Tube socket
34864	Socket—Tuning indicator tube socket
70576	Spring—Drive cord spring
31418	Spring—Indicator cord spring
12007	Spring—Retaining spring for I-F transformers' core and stud assemblies
31261	Spring—Retaining spring for 19-13 meter band and oscillator coil core and stud assemblies
33491	Switch—Radio-phono switch (S7)
37050	Switch—Range switch (S1, S2, S3, S4, S5, S6)
35636	Transformer—First I-F transformer (L20, L21, C30, C31)
36615	Transformer—Second I-F transformer (L22, L23, C33, C34 C35)
31733	Transformer—Power transformer, 105-125 volts, 50/60 cycle (T1)
31734	Transformer—Power transformer, 105-125 volts, 25/60 cycle (T1)
31735	Transformer—Power transformer, 105/130, 140/160, 200/250 volts, 50/60 cycle (T1)
34373	Washer—"C" washer for range switch actuating arm
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY Stamped 92562-1J
70972	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker cable
70971	Speaker—6" x 9" EM speaker complete with cone and voice coil less output transformer and plug
70973	Transformer—Output transformer (T2)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70589	Back—Cabinet back
70591	Board—Baffle board and grille cloth
70590	Bracket—Lamp bracket
30716	Clip—Tuning tube clip
39967	Crystal—Protective crystal for tuning tube
70579	Decal—Trade mark decal
39916	Dial—Glass dial scale
37922	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Volume control or tuning knob
11891	Lamp—Dial lamp
39859	Rail—Pointer rail
36641	Retainer—Retainer for tuning tube crystal
33438	Screw—Thumb screw for tube clip
14270	Spring—Retaining spring for tone control knob, volume control or tuning knob and for range switch knob
4982	Spring—Retaining spring for range indicator knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model Q36

RCA MODEL Q36

Chassis No. RC-585—Mfr. No. 274

Service Data

1946 . . . . X2

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.46-11.8 mc (31.7-25.4 m)
"25" Meter Spread Band	11.67-15.2 mc (25.7-19.8 m)
"19" Meter Spread Band	15.07-17.9 mc (19.9-16.8 m)
"16" Meter Spread Band	17.735-18.1 mc (16.9-16.6 m)
"13" Meter Spread Band	21.41-22.5 mc (14.0-13.4 m)
Intermediate Frequency	455 kc

Tube Complement

(1)	RCA-6SG7	R-F Amplifier
(2)	RCA-6SA7	1st Detector
(3)	RCA-6SA7	Oscillator
(4)	RCA-6SK7	I-F Amplifier
(5)	RCA-6SQ7	A-F Amplifier
(6)	RCA-6R7	Phase Inverter, 2nd Detector
(7)	RCA-6SK7	Automatic Tone Control
(8)	RCA-6F6G	Power output
(9)	RCA-6F6G	Power output
(10)	RCA-6U5/6G5	Tuning indicator
(11)	RCA-5U4G	Rectifier

Pilot Lamps .... 9-type 47; 6.3 volts, 0.15 amps.

Power Output Rating

Undistorted	10 watts
Maximum	12 watts

Loudspeakers

One Model RL-63L3 and one model RL-63L4

Type (Electrodynamic)	8 inches
V-C Impedance at 400 c.p.s.	2.2 ohms

Victrola Attachment

A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

A 110-volt outlet for Victrola attachment is available on back of the chassis.

Cabinet Dimensions

Height	14¾ inches
Width	24¾ inches
Depth	12⅞ inches
Net Weight	approx. 49 pounds
Shipping Weight	approx. 56 pounds

Chassis Base Dimensions (inches) Height, 3½; Length, 22; Depth 13

Over-all Chassis Height	12¾ inches
Tuning Drive Ratio	25 to 1

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105 to 125, nominal 117	50 to 60	135
Rating B	105 to 125, nominal 117	25 to 60	135
Rating D	(See below)	40 to 60	135

110 position	100 min.	115 max.
125 position	115 min.	135 max.
150 position	135 min.	165 max.
210 position	190 min.	230 max.
240 position	220 min.	260 max.

Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

CAUTION: Remove power cord from line receptacle before changing link position.

Automatic Tone Control.—

The Model Q36 incorporates a circuit for automatically attenuating noise and selective fading distortion components.

Basically the circuit is a combination of a high pass filter and variable inverse feedback controlled by the AVC voltage.

Capacitor C71 (100 mmf.) and resistor R34 (1.2 meg.) couple the plate of the 6R7 (tube 6) to the grid of the 6SK7 (tube 7). The plate of this tube is connected to the grid of the 6SQ7 (tube 5) through capacitor C67 (82 mmf.). The grid bias for the 6SK7 (tube 7) is obtained from the AVC bus through R16 (2.2 meg.) and R33 (68M).

The values of C71, R34, C67 and R33 are such that this inverse feedback loop passes only the high audio frequencies therefore they are the frequencies that are attenuated in the output of the audio system. The amount of attenuation of the "highs" is controlled by the negative voltage on the AVC bus.

When the incoming signal is weak the AVC voltage is close to zero, the gain of the ATC 6SK7 is large and the attenuation of the highs is a maximum; when the incoming signal is strong the AVC voltage becomes more negative thus decreasing the gain and thereby increasing the high frequency response of the audio system. The cathode of the 6SK7 (tube 7) is grounded only when S7 is switched to either "Radio" position; the ATC circuit is inoperative when S7 is in either of the "Phono" positions.

With an R.F. input of 100 microvolts the audio frequency response at 2000 cycles is down approximately 20 db. as compared to the response obtained with an RF input of 10,000 microvolts.

If desired, the amount of high frequency attenuation at a particular value of input signal below approximately 10,000 microvolts may be varied by changing the value of R33. Increasing R33 will increase the attenuation of the "highs"; decreasing R33 will decrease the attenuation.

A quick check of the operation of the circuit may be made by tuning in a weak station and then pulling the 6SK7 (tube 7) out of its socket, a very noticeable increase in the high frequency audio response will indicate that the circuit is functioning properly.

As can be well appreciated by the foregoing explanation of ATC operation, it is desirable to use an antenna with good signal pickup when full fidelity is required. Short length antennas should be avoided whenever possible.

Change in Speaker RL-63L4 (92518-2)

This speaker was originally designed with a 3300 ohm field coil. Due to supply difficulties some have been produced with a 2100 ohm field coil. The number 2100 is stamped on the magnet yoke to provide identification. An external 1200 ohm resistor mounted on the speaker is connected in series with the brown speaker field lead.

Addition to Parts List:

SPEAKER ASSEMBLIES RL-63L4

Add:

54418 Resistor—1200 ohms, 5 watt.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each spread-band so that these stations come in at the correct points on the dial.

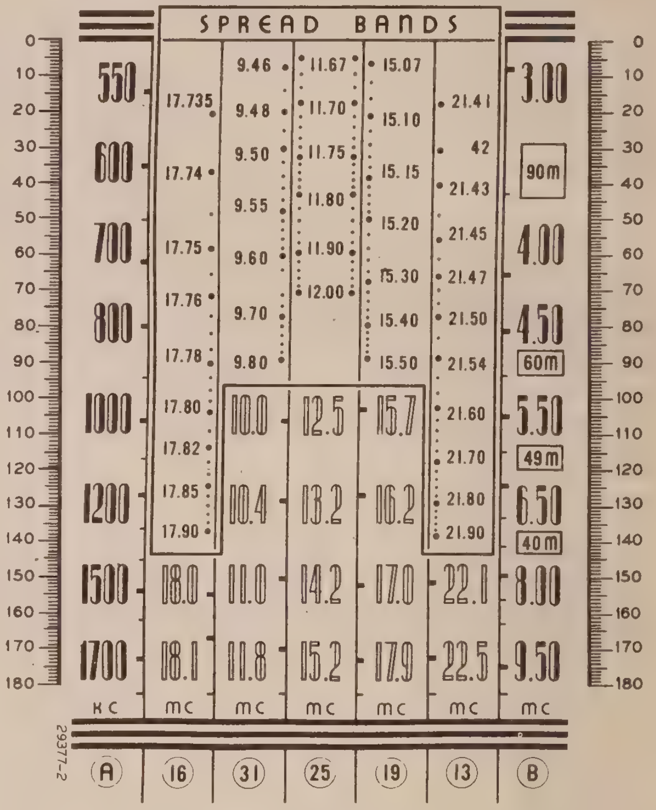
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

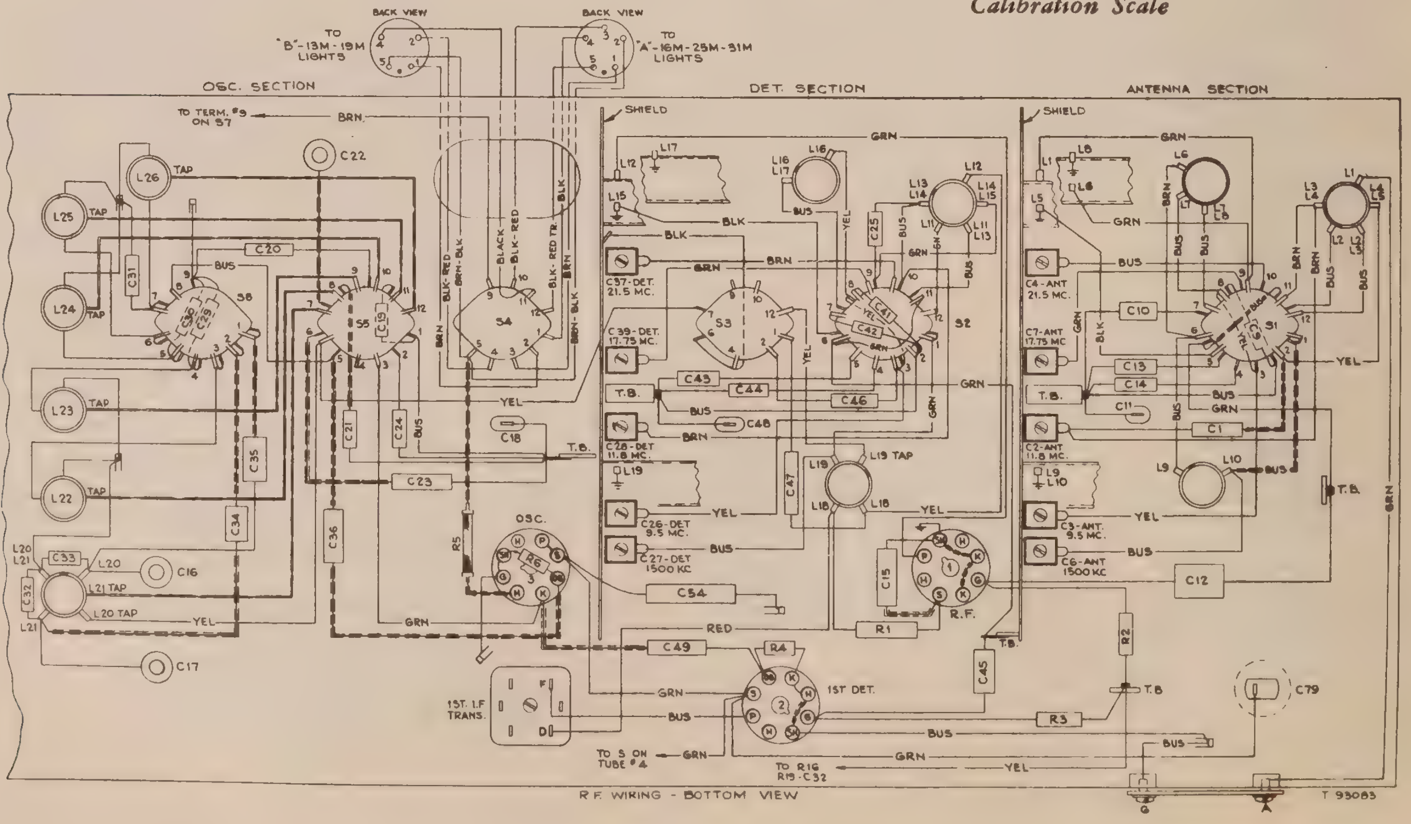
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetic-core for each band should be retouched so that the stations come in at the correct points on the dial.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with the indicator to the line under "Spread Bands" on the glass dial plate with the gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional information, refer to booklet "RCA Victor Receiver Alignment."


SPREAD BANDS
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
550
600
700
800
1000
1200
1500
1700
17.735
17.74
17.75
17.76
17.78
17.80
17.82
17.85
17.90
18.0
18.1
9.46
9.48
9.50
9.55
9.60
9.70
9.80
10.0
10.4
11.0
11.8
11.67
11.70
11.75
11.80
11.90
12.00
12.5
13.2
14.2
15.2
15.07
15.10
15.15
15.20
15.30
15.40
15.50
15.7
16.2
17.0
17.9
21.41
42
21.43
21.45
21.47
21.50
21.54
21.60
21.70
21.80
21.90
22.1
22.5
3.00
90m
4.00
4.50
60m
5.50
49m
6.50
40m
8.00
9.50
KC
MC
MC
MC
MC
MC
MC
(A)
(16)
(31)
(25)
(19)
(13)
(B)
29377-2

Receiver Dial with Calibration Scale

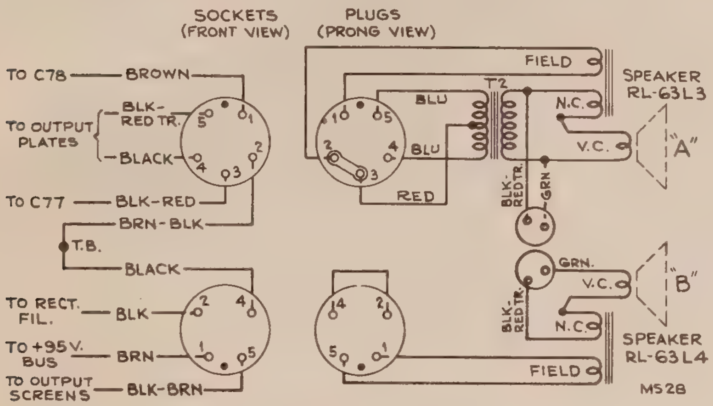

BACK VIEW
TO "B"-13M-19M LIGHTS
BACK VIEW
TO "A"-16M-25M-31M LIGHTS
OSC. SECTION
DET. SECTION
ANTENNA SECTION
TO TERM. #9 ON S7
SHIELD
C22
L26
L25
L24
L23
L22
L20 L21
C33
C32
C16
C17
C20
C31
C35
C34
C36
C21
C24
C19
C23
C18
S6
S5
S4
S3
S2
S1
R5
R6
OSC.
C37-DET. 21.5 MC.
C39-DET. 17.75 MC.
C28-DET 11.8 MC.
C26-DET 9.5 MC.
C27-DET 1500 KC
C43
C44
C46
C47
C48
C54
C49
R4
R1
R2
R3
C15
C45
L19
L19 TAP
L18
L17
L16
L12
L13 L14
L15
L11
C25
C41
C42
R.F.
1ST DET.
1ST. I.F. TRANS.
TO 3 ON TUBE #4
TO R16 R19-C32
C4-ANT 21.5 MC.
C7-ANT 17.75 MC
C2-ANT 11.8 MC.
C3-ANT 9.5 MC.
C6-ANT 1500 KC
C10
C13
C14
C11
C1
C12
C79
L1
L2
L3 L4
L5
L6
L7
L8
L9
L10
T.B.
G
A
RF WIRING - BOTTOM VIEW
T 93083

R. F. Wiring, Bottom View

Alignment Procedure

Precautionary Lead Dress.—

1. All leads in the R.F. assembly should be dressed away from coils, switch assemblies, capacitors, shield plates, and mounting plates.
2. All capacitors in the R.F. assembly should be dressed apart from each other and away from the Range Switch drive shaft.
3. All indicating light cable leads to S4 should be dressed toward the shield plate and away from all other leads and components.
4. Leads and components connected to the oscillator and 1st Detector tube sockets must not impede the flexible mounting.
5. The green lead from pin 4 of the oscillator tube socket to pin 4 of the 1st Detector should be dressed close to C54.
6. All excess power transformer leads should be dressed back between transformer and rear chassis apron and close to chassis base.
7. The capacitors that connect the volume control and tone control should be dressed away from other parts.


SOCKETS (FRONT VIEW)
PLUGS (PRONG VIEW)
TO C78
BROWN
TO OUTPUT PLATES
BLK-RED TR.
BLACK
TO C77
BLK-RED
BRN-BLK
T.B.
BLACK
TO RECT. FIL.
BLK
TO +95V. BUS
BRN
TO OUTPUT SCREENS
BLK-BRN
BLU
BLU
RED
T2
FIELD
N.C.
V.C.
SPEAKER RL-63L3
"A"
BLK-REDTR.
GRN.
GRN.
V.C.
"B"
BLK-REDTR.
N.C.
FIELD
SPEAKER RL-63L4
MS28

Loudspeaker Connections

Loudspeaker.—It is essential that the two speaker cones move in and out together, i.e. in phase. For an outline of test methods refer to RCA Victor Supplementary Information—No. 5 "Speaker Phasing."

ALIGNMENT TABLE

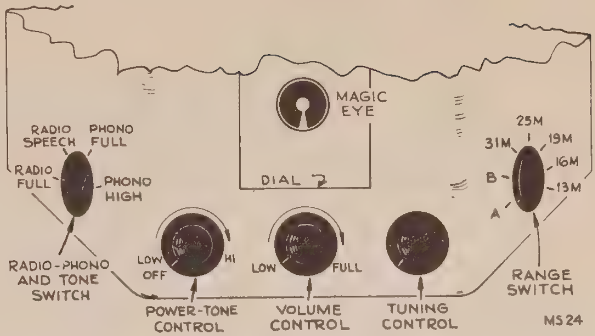
Steps	Connect the high side of test osc. to—	Tune test osc. to—	Turn Range Switch to—	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (35°)	L30-L29 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L28-L27 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (154°)	C16 (osc.) C27 (det.) C6 (ant.)
4		600 kc	"A" Band	600 kc (35°)	L20* Rock in
5	Repeat steps 3 and 4 until aligned				
6	Antenna terminal in series with 300 ohms	9.5 mc	"31M" Band	9.5 mc (30°)	L22 (osc.)* C26 (det.) C3 (ant.)
7		11.8 mc	"31M" Band	11.8 mc (170°)	C22 (osc.) **
8	Repeat steps 6 and 7				
9	Antenna terminal in series with 300 ohms	9.5 mc	"B" Band	9.5 mc (175.5°)	C17 (osc.) **
10		11.8 mc	"25M" Band	11.8 mc (43°)	L23 (osc.)* C28 (det.) C2 (ant.)
11		15.2 mc	"19M" Band	15.2 mc (50°)	L24 (osc.)*
12		17.75 mc	"16M" Band	17.75 mc (58°)	L25 (osc.)*** C39 (det.) C7 (ant.)
13		21.5 mc	"13M" Band	21.5 mc (77°)	L26 (osc.)*** C37 (det.) C4 (ant.)

* If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

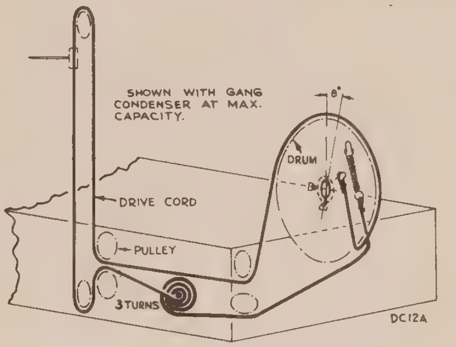
** Use minimum capacity peak if two can be obtained.

*** If two peaks can be obtained use the one obtained when the core screw is farthest in (clockwise).

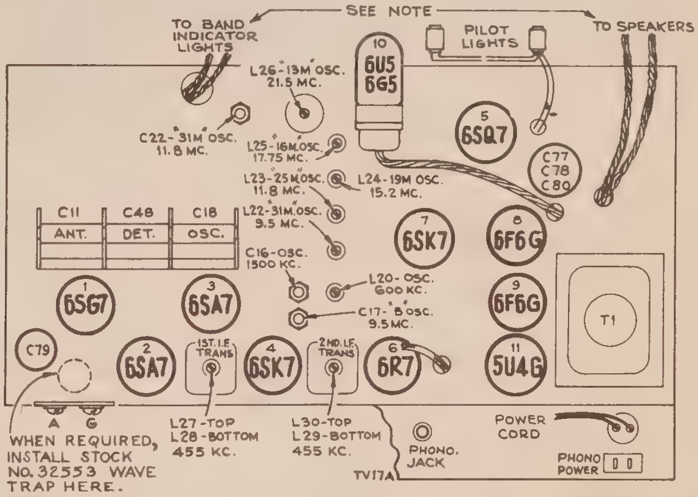
NOTE: Oscillator tracks above signal on all except the 16M and 13M bands.


MAGIC EYE
RADIO SPEECH
PHONO FULL
RADIO FULL
PHONO HIGH
DIAL
25M
31M
19M
16M
B
13M
A
LOW
HI
OFF
LOW
FULL
RADIO-PHONO AND TONE SWITCH
POWER-TONE CONTROL
VOLUME CONTROL
TUNING CONTROL
RANGE SWITCH
MS24

Location of Controls


SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
8°
DRUM
B
DRIVE CORD
PULLEY
3 TURNS
DC12A

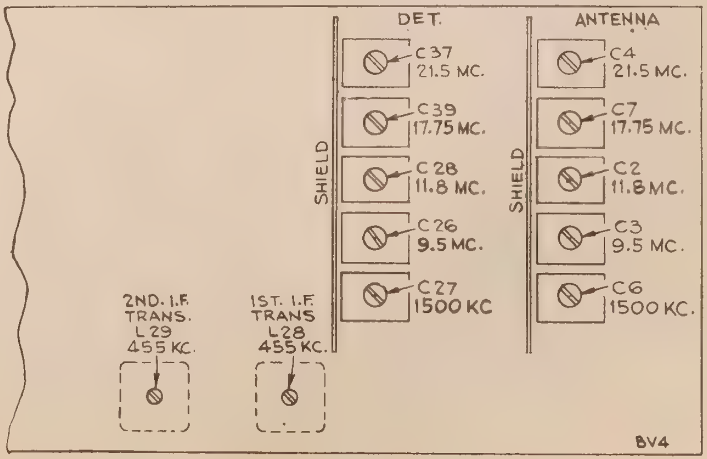
Dial-Indicator and Drive Mechanism


SEE NOTE
TO BAND INDICATOR LIGHTS
PILOT LIGHTS
TO SPEAKERS
L26-"13M" OSC. 21.5 MC.
10 6U5 6G5
C22-"31M" OSC. 11.8 MC.
L25-"16M" OSC. 17.75 MC.
L23-"25M" OSC. 11.8 MC.
L24-19M OSC. 15.2 MC.
L22-"31M" OSC. 9.5 MC.
5 6SQ7
C77 C78 C80
C11 ANT.
C48 DET.
C18 OSC.
C16-OSC. 1500 KC.
L20-OSC. 600 KC.
C17-"B" OSC. 9.5 MC.
7 6SK7
8 6F6G
9 6F6G
1 6SG7
3 6SA7
T1
C79
2 6SA7
1ST. I.F. TRANS.
4 6SK7
2ND. I.F. TRANS.
6 6R7
11 5U4G
A
G
WHEN REQUIRED, INSTALL STOCK NO. 32553 WAVE TRAP HERE.
L27-TOP L28-BOTTOM 455 KC.
L30-TOP L29-BOTTOM 455 KC.
PHONO. JACK
POWER CORD
PHONO POWER
TV17A

Tube and Trimmer Locations (Top View)

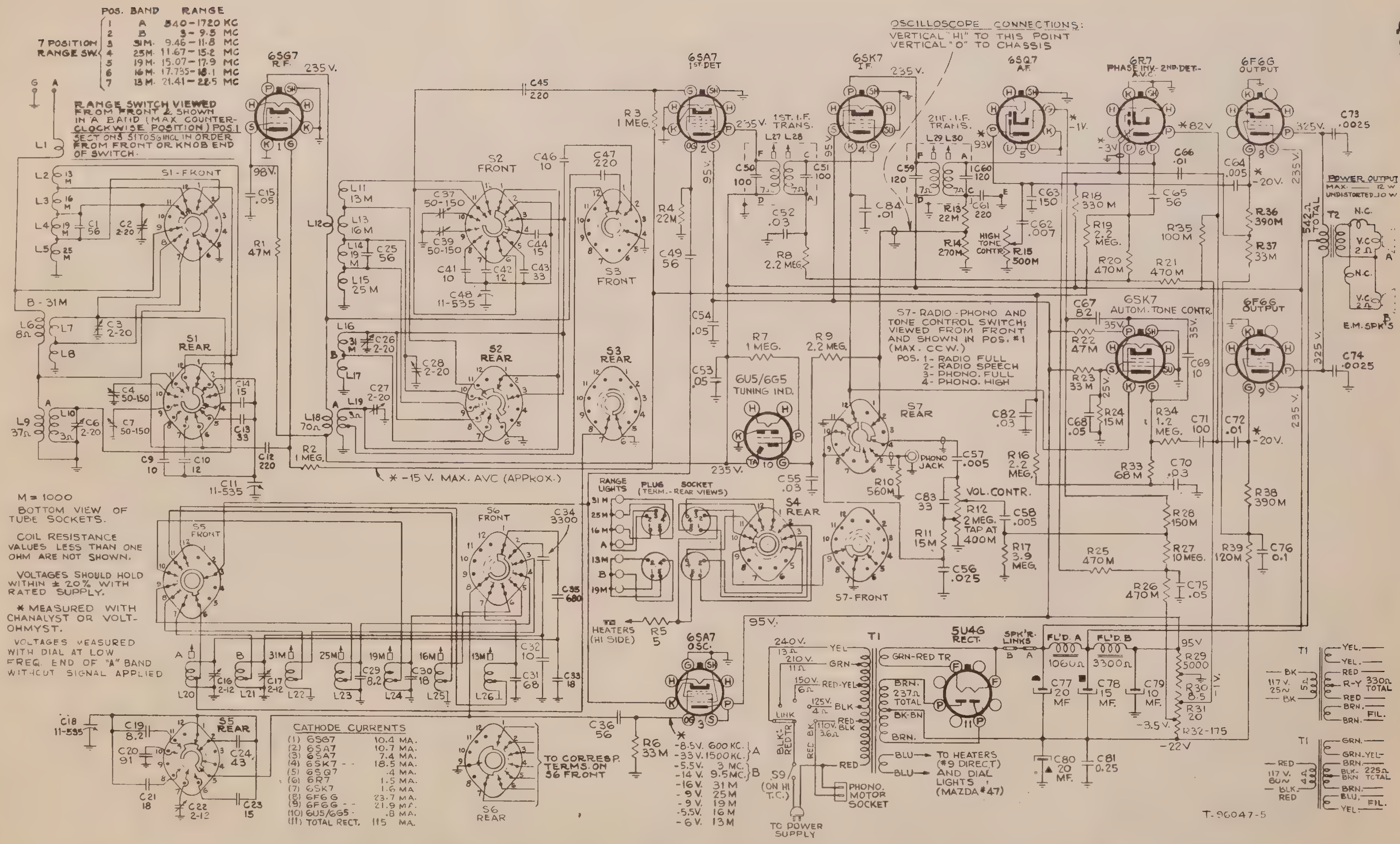
Caution.—The sockets used on the band indicator light cables are identical to those used on the speaker cables. In connecting, care should be taken to assure that the cables are plugged to the proper units.

Use of Wave Trap.—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap behind antenna and ground terminal board as indicated above. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot. Adjust capacitor to resonance with interfering station.


DET.
ANTENNA
C37 21.5 MC.
C39 17.75 MC.
C28 11.8 MC.
C26 9.5 MC.
C27 1500 KC
C4 21.5 MC.
C7 17.75 MC.
C2 11.8 MC.
C3 9.5 MC.
C6 1500 KC.
SHIELD
SHIELD
2ND. I.F. TRANS. L29 455 KC.
1ST. I.F. TRANS L28 455 KC.
BV4

Trimmer Locations (Bottom View)

Q36


POS. BAND RANGE
7 POSITION RANGE SW.
1 A 540-1720 KC
2 B 3-9.5 MC
3 31M. 9.46-11.8 MC
4 25M. 11.67-15.2 MC
5 19M. 15.07-17.9 MC
6 16M. 17.735-18.1 MC
7 13M. 21.41-22.5 MC
RANGE SWITCH VIEWED FROM FRONT & SHOWN IN A BAND (MAX COUNTER-CLOCKWISE POSITION) POS.1
SECTIONS S1 TO S6 INCL IN ORDER FROM FRONT OR KNOB END OF SWITCH.
OSCILLOSCOPE CONNECTIONS: VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS
6SG7 R.F.
6SA7 1ST DET
6SK7 I.F.
6SQ7 A.F.
6R7 PHASE INV.-2ND DET.-A.V.C.
6F6G OUTPUT
6SK7 AUTOM. TONE CONTR.
6U5/6G5 TUNING IND.
6SA7 OSC.
5U4G RECT.
1ST. I.F. TRANS.
2ND I.F. TRANS.
S7- RADIO-PHONO AND TONE CONTROL SWITCH; VIEWED FROM FRONT AND SHOWN IN POS. #1 (MAX. CCW.)
POS. 1- RADIO FULL
2- RADIO SPEECH
3- PHONO. FULL
4- PHONO. HIGH
POWER OUTPUT MAX. 12 W UNDISTORTED 10 W
E.M. SPK'S
VOL. CONTR.
HIGH TONE CONTR.
PHONO JACK
* -15 V. MAX. AVC (APPROX.)
RANGE LIGHTS
PLUG SOCKET (TERM.- REAR VIEWS)
TO HEATERS (HI SIDE)
M = 1000
BOTTOM VIEW OF TUBE SOCKETS.
COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY.
* MEASURED WITH CHANALYST OR VOLT-OHMYST.
VOLTAGES MEASURED WITH DIAL AT LOW FREQ. END OF "A" BAND WITHOUT SIGNAL APPLIED
CATHODE CURRENTS
(1) 6SG7 10.4 MA.
(2) 6SA7 10.7 MA.
(3) 6SA7 7.4 MA.
(4) 6SK7 18.5 MA.
(5) 6SQ7 .4 MA.
(6) 6R7 1.5 MA.
(7) 6SK7 1.6 MA
(8) 6F6G 23.7 MA.
(9) 6F6G 21.9 MA.
(10) 6U5/6G5 .8 MA.
(11) TOTAL RECT. 115 MA.
TO CORRESP. TERMS. ON S6 FRONT
-8.5V. 600 KC. A
-33 V. 1500 KC. A
-5.5V. 3 MC. B
-14 V. 9.5 MC. B
-16V. 31 M
-9 V. 25 M
-9 V. 19 M
-5.5V. 16 M
-6 V. 13 M
S9 (ON HI T.C.)
TO POWER SUPPLY
PHONO. MOTOR SOCKET
TO HEATERS (#9 DIRECT) AND DIAL LIGHTS (MAZDA #47)
SPK'R. LINKS
FL'D. A 106Ω
FL'D. B 3300Ω
T1
T2
T-96047-5

NOTE: On some sets C52, C55, C70 or C82 may be .025 mfd.

NOTE: In some sets and on some replacement units, the power transformer lead color code may vary from that shown above. On universal transformers (Rating D), the primary start may be black, the 110 v. tap black/yellow, and the link, black/red. The primary leads on the 25 and 60 cycle transformers (Ratings A and B) may be black. Secondaries of the three transformers would be—rectifier filament, yellow—high voltage, red—high voltage center tap, red/yellow—amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

Schematic Diagram

Replacement Parts

Stock No.	Description
	CHASSIS ASSEMBLIES **RC-585**
39791	Bearing—Tuning knob shaft bearing
37053	Board—"Antenna-Ground" board
39799	Bracket—Long bracket complete with three (3) drive cord pulleys
39800	Bracket—Upper bracket complete with one (1) drive cord pulley
36397	Calibrator—Drive drum calibrator
12884	Capacitor—Air trimmer, 2-12 mmf. (C16, C17, C22)
70597	Capacitor—Ceramic, 8.2 mmf. (C19, C29)
33098	Capacitor—Ceramic, 10 mmf. (C32)
45466	Capacitor—Ceramic, 10 mmf. (C9, C41, C46)
39604	Capacitor—Mica, 10 mmf (C69)
70595	Capacitor—Ceramic, 12 mmf. (C10, C42)
45465	Capacitor—Ceramic, 15 mmf. (C14, C23, C44)
39041	Capacitor—Ceramic, 18 mmf. (C21, C33)
71020	Capacitor—Ceramic, 18 mmf. (C30)
39616	Capacitor—Mica, 33 mmf. (C83)
70596	Capacitor—Ceramic, 33 mmf. (C13, C43)
71022	Capacitor—Ceramic, 43 mmf. (C24)
39794	Capacitor, Mica trimmer, consisting of 2 sections of 50-150 mmf. and 3 sections of 2-20 mmf. (C2, C3, C4, C6, C7 and C26, C27, C28, C37, C39)
39622	Capacitor—Mica, 56 mmf. (C65)
70594	Capacitor—Ceramic, 56 mmf. (C1, C25)
70599	Capacitor—Ceramic, 56 mmf. (C36, C49)
70593	Capacitor—Ceramic, 68 mmf. (C31)
39626	Capacitor—Mica, 82 mmf. (C67)
71021	Capacitor—Ceramic, 91 mmf. (C20)
39628	Capacitor—Mica, 100 mmf. (C50, C51, C71)
39630	Capacitor—Mica, 120 mmf. (C59, C60)
39632	Capacitor—Mica, 150 mmf. (C63)
39636	Capacitor—Mica, 220 mmf. (C12, C45, C47, C61)
39648	Capacitor—Mica, 680 mmf. (C35)
39664	Capacitor—Mica, 3300 mmf. (C34)
71006	Capacitor—Tubular, .0025 mfd., 1600 volts (C73, C74)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C57, C58)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C64)
70629	Capacitor—Tubular, .007 mfd., 600 volts (C62)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C66)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C72, C84)
70612	Capacitor—Tubular, .025 mfd., 200 volts (C56)
70613	Capacitor—Tubular, .03 mfd., 200 volts (C52, C55, C70, C82)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C54, C68, C75)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C15, C53)
70617	Capacitor—Tubular, 0.1 mfd., 200 volts (C76)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C81)
33879	Capacitor—Electrolytic, 10 mfd., 300 volts (C79)
34393	Capacitor—Electrolytic, consisting of 1 section of 20 mfd., 450 volts; 1 section of 15 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C77, C78, C80)
39797	Coil—Antenna coil, "A" band (L9, L10)
39796	Coil—Antenna coil, "B" and 31 meter bands (L6, L7, L8)
39792	Coil—Antenna or R.F. coil, 25, 19, 16, and 13 meters (L1, L2, L3, L4, L5, L11, L12, L13, L14, L15)
39804	Coil—Oscillator coil, "A" and "B" bands (L20, L21)
39808	Coil—Oscillator coil, 13 and 16 meter bands (L25, L26)
39805	Coil—Oscillator coil, 19 meter bands (L24)
39806	Coil—Oscillator coil, 25 meter band (L23)
39807	Coil—Oscillator coil, 31 meter band (L22)
39795	Coil—R.F. coil, "A" band (L18, L19)
39798	Coil—R.F. coil, 'B" band and 31 meter band (L16, L17)
39785	Condenser—Variable tuning condenser (C11, C18, C48)
39788	Control—Tone control and power switch (R15, S9)
39789	Control—Volume control (R12)
34662	Cord—Indicator cord (approx. 63 in. overall length)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
12006	Core—Adjustable core and stud for I.F. transformers
31259	Core—Adjustable core and stud for 13 meter, 16 meter, 19 meter, 25 meter, and 31 meter bands oscillator coils
36396	Drum—Drive drum less calibrator
18469	Plate—Bakelite mounting plate for capacitor # 34393
5040	Plug—4 contact female plug for speaker or band indicator cable
12493	Plug—5 contact female plug for speaker or band indicator cable
35973	Pulley—Drive cord pulley
36637	Receptacle—A.C. power receptacle
36842	Resistor—Flexible, wire wound 5 ohms, 1 watt (R5)
39803	Resistor—Voltage divider consisting of 1 section of 155 ohms, 3 watt; 1 section of 20 ohms, 0.2 watt; 1 section of 8.5 ohms, 0.1 watt; and 1 section of 5000 ohms, 2.5 watt (R29, R30, R31, R32)
36714	Resistor—15,000 ohms, ½ watt (R11, R24)
30492	Resistor—22,000 ohms, ¼ watt (R4, R13)
30685	Resistor—33,000 ohms, ½ watt (R6, R23, R37)
30787	Resistor, 47,000 ohms, ½ watt (R22)
30495	Resistor, 47,000 ohms, 1 watt (R1)
14138	Resistor—68,000 ohms, ¼ watt (R33)
3252	Resistor, 100,000 ohms, ½ watt (R35)
30180	Resistor—120,000 ohms, ¼ watt (R39)
14020	Resistor—150,000 ohms, ¼ watt (R28)
30651	Resistor—270,000 ohms, ¼ watt (R14)
14983	Resistor—330,000 ohms, ½ watt (R18)
11988	Resistor—390,000 ohms, ¼ watt (R36, R38)
30648	Resistor—470,000 ohms, ¼ watt (R20, R21, R25, R26)
30653	Resistor—560,000 ohms, ¼ watt (R10)
30652	Resistor—1 megohm, ¼ watt (R2, R3, R7)
30162	Resistor—1.2 megohm, ¼ watt (R34)
30649	Resistor—2.2 megohms, ¼ watt (R8, R9, R16, R19)
70592	Resistor—3.9 megohms, ¼ watt (R17)
30992	Resistor—10 megohms, ¼ watt (R27)
14350	Screw—#8-32 square head set screw for drive drum
39790	Shaft—Tuning knob shaft and flywheel
31365	Socket—Lamp socket
35787	Socket—Phono input socket
31252	Socket—Tube socket
34864	Socket—Tuning tube socket
31418	Spring—Indicator cord spring
12007	Spring—Retaining spring for I.F. transformers, core and stud assemblies
31261	Spring—Retaining spring for oscillator coils' core and stud assemblies and for 13 meter band oscillator coil, core and stud
39787	Switch—Radio-phono switch (S7)
39793	Switch—Range switch (S1, S2, S3, S4, S5, S6)
35636	Transformer—First I.F. transformer (L27, L28, C50, C51)
36615	Transformer—Second I.F. transformer (L29, L30, C59, C60, C61)
39786	Transformer—Power transformer—105-125 volts, 25 to 60 cycle (T1)
36044	Transformer—Power transformer—105-125 volts, 50 to 60 cycle (T1)
34183	Transformer—Power transformer—110-125-150-210-240 volts, 40 to 60 cycle (T1, S8)
33726	Washer—"C" washer for drive cord pulley
2917	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES **RL-63L3**
13867	Cap—Dust cap
12079	Coil—Field coil—1060 ohms
11469	Coil—Neutralizing coil
71825	Cone—Cone complete with voice coil
30868	Plug—2 contact female plug
31539	Plug—5 prong male plug
37997	Transformer—Output transformer
	SPEAKER ASSEMBLIES **RL-63L4**
13867	Cap—Dust cap
71826	Coil—Field coil—3300 ohms
11469	Coil—Neutralizing coil
71825	Cone—Cone complete with voice coil
30870	Plug—2 prong male plug
5039	Plug—4 prong male plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39819	Back—Cabinet back
30716	Clip—Tuning tube clip
70579	Decal—Trade mark decal
70665	Dial—Glass dial scale
70666	Indicator—Station selector indicator
70664	Knob—Radio-phono, or range switch knob
70663	Knob—Tone control, volume control, or tuning knob
31480	Lamp—Dial lamp
39816	Plate—Dial back plate less indicator, tube clip and dial
5039	Plug—4-prong male plug for band indicator cable
12567	Plug—5-prong male plug for band indicator cable
31482	Screw—#8-32 square head set screw for radio-phono switch shaft
36658	Shaft—Radio-phono switch shaft
31365	Socket—Lamp socket
14270	Spring—Retaining spring for radio-phono or range switch knobs and for tone control, volume control, or tuning knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA PHONOGRAPH

MOTOR-TURNTABLE ASSEMBLIES

RIM DRIVEN • FAN COOLED

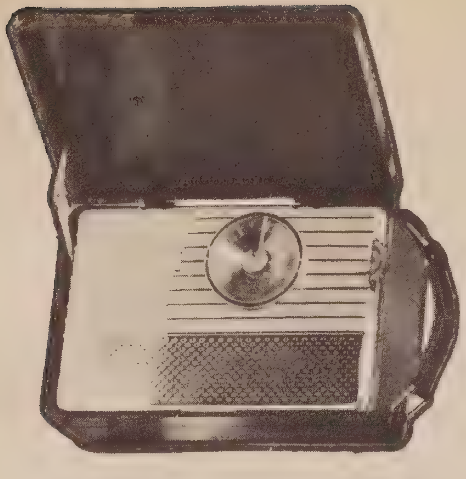
STOCK NO. 70121 (SHOWN ABOVE) HAS 9-INCH TURNTABLE

STOCK NO. 72781 (NOT ILLUSTRATED) HAS 6½-INCH TURNTABLE

Here are your new motor-turntable assemblies designed for quick starting, neat appearance, and smooth velvety operation. The turntables are attractively finished in a flock that blends well with nearly any cabinet. The powerful motors instantly pick up to a constant speed of 78 rpm. Shock-absorbing rim drives feature spring-type idler arrangements which insure quiet operation. Fan cooling permits use in partly closed cabinets. These assemblies are built for top performance and long dependable operation. Detailed characteristics are given in the table below.

Use these assemblies as replacement components, or install them in old-style spring-motor phonographs. Either is ideal for building your own record player to promote record sales. These motors are expertly engineered for complete satisfaction to you and your customers.

STOCK NO.	VOLTAGE	TURNTABLE DIAMETER	MAX. DEPTH BELOW MTG. PLATE	MAX. WATTS (No load)	MAX. WOW
70121	117 V., 60 cps.	9 inches	2 3/32 inches	20.5	1%
72781	117 V., 60 cps.	6½ inches	2 3/8 inches	20.5	1%



PH 35

RCA VICTOR

54B1, 54B1-N, 54B2, 54B3

RC-589, RC-589D, RC-589A, RC-589B

Mfr. No. 274

SERVICE DATA

— 1945 No. 7 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range .... 550-1,600 kc
Intermediate Frequency .... 455 kc
Power Supply

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt RCA-VS 036 or VS 001	0.25 amperes	5-6 hours
"B"—67.5 volts RCA-VS O16	8.5 milliamperes	25-40 hours

Power Output........ Undistorted 0.05 watts .... Maximum 0.12 watts
Loudspeaker
Type Permanent-Magnet Dynamic Elliptical .... 2 x 3 in.
Voice Coil Impedance .... 11¾ ohms at 1000 cycles
Cabinet Dimensions (inches)............ 3-3/16 x 6½ x 4-3/16
Weight........ 3¼ lbs. (net) Tuning Drive Ratio ....1 to 1

2ND PRODUCTION:

Chassis No. RC-589U, RC-589UA, RC-589UB

Second production of these models use type 1U5 tube in place of type 1S5 (2nd Det.-A.F.-A.V.C.). They may be identified by the letter U in the RC No. which is stamped on the tuning condenser or chassis.

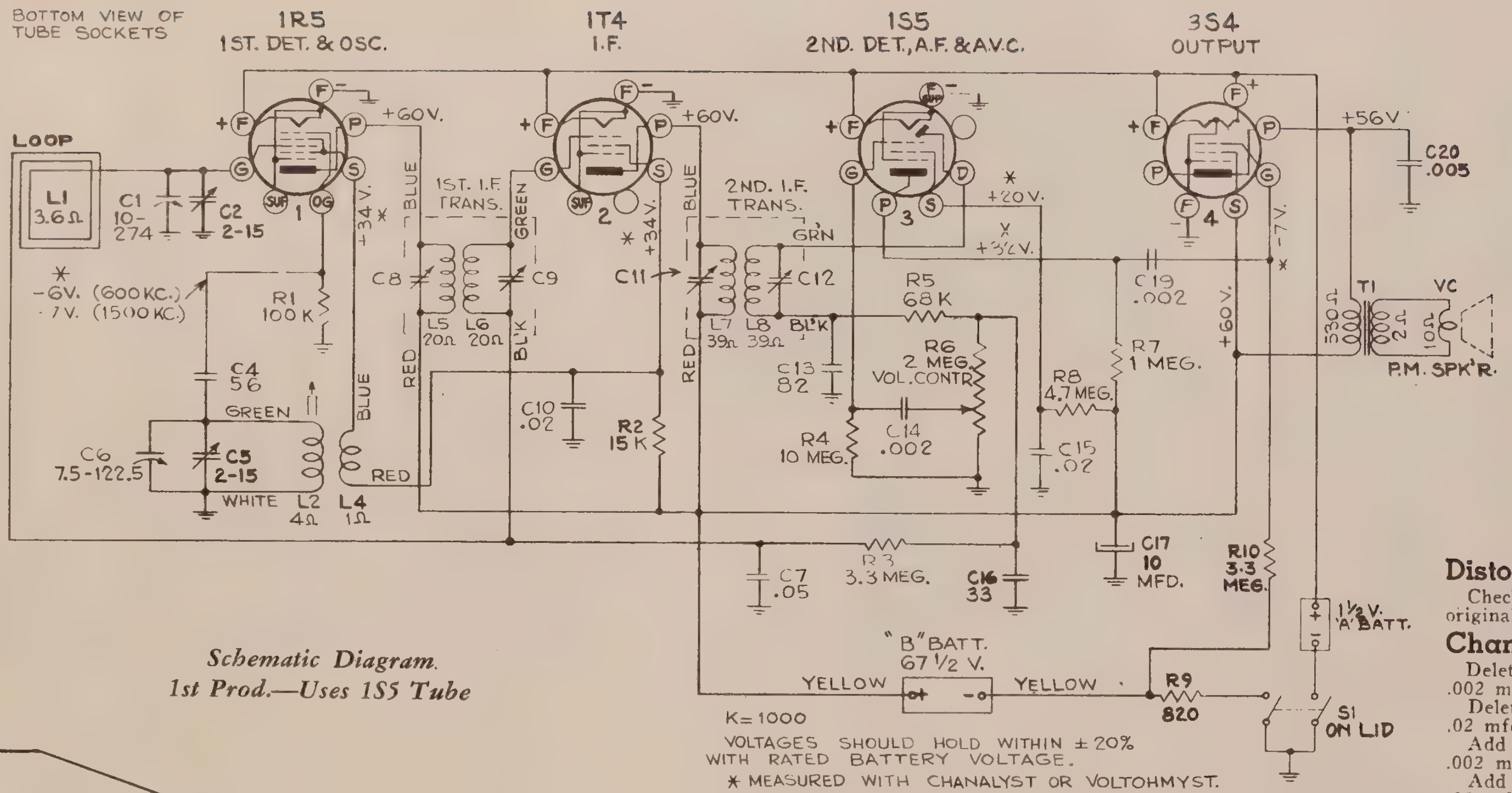
Replacement parts are identical except Stock No.:

72230 Support—Tube support less tube sockets and transformer.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES—RC 589 54B1 BLACK RC 589A 54B2 BROWN—RC 589B 54B3 RED
70444	Board—Speaker terminal board (5 contact)
70445	Board—Terminal board (1 contact)
33111	Capacitor—Ceramic, 33 mmf (C16)
71924	Capacitor—Ceramic, 56 mmf (C4)
71514	Capacitor—Ceramic, 82 mmf (C13)
	Capacitor—Tubular, .002 mfd., (C14, C19)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)
	Capacitor—Tubular, .02 mfd., (C10, C15)
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)
70443	Coil—Oscillator coil (L2, L4)
70438	Condenser—Variable tuning condenser (C1, C2, C5, C6)
70452	Connector—Loop connector (1 set)
70439	Control—Volume control (R6)
70448	Fastener—Push fastener to hold loop (2 required)
70429	Grommet—Rubber grommet for tube support (2 required), and to mount variable condenser (3 required)
70434	Hinge—Lid hinge—Model 54B1—Black (2 required)
70984	Hinge—Lid hinge—Model 54B2—Brown (2 required)
71563	Hinge—Lid hinge—Model 54B3—Red (2 required)
70441	Holder—Battery holder
70424	Knob—Tuning knob
70432	Knob—Volume control knob
70708	Lead—Battery lead complete
70450	Lid—Case lid complete with lid support less loop—Model 54B1—Black
70986	Lid—Case lid complete with lid support less loop—Model 54B2—Brown
71565	Lid—Case lid complete with lid support less loop—Model 54B3—Red
70447	Loop—Antenna loop complete with connectors less lid — Model 54B1—Black
70985	Loop—Antenna loop complete with connectors less lid — Model 54B2—Brown
71564	Loop—Antenna loop complete with connectors less lid—Model 54B3—Red
70449	Nameplate—"RCA" nameplate
70427	Nut—Retaining nut for lid support stud
70420	Panel—Chrome panel
70422	Plate—Backing plate for mounting hinge on lid—Model 54B1—Black (2 required)
70983	Plate—Backing plate for mounting hinge on lid—Model 54B2—Brown (2 required)
71562	Plate—Backing plate for mounting hinge on lid—Model 54B3—Red (2 required)
14076	Resistor—820 ohms, ¼ watt (R9)
36714	Resistor—15,000 ohms, ¼ watt (R2)
14138	Resistor—68,000 ohms, ¼ watt (R5)
3252	Resistor—100,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R7)
12928	Resistor—3.3 megohms, ¼ watt (R3, R10)
30931	Resistor—4.7 megohms, ¼ watt (R8)
30992	Resistor—10 megohms, ¼ watt (R4)
70421	Screw—Case cover mounting screw (1 set)—Model 54B1
71150	Screw—Case cover mounting screw—Model 54B2
71725	Screw—Case cover mounting screw (1 set)—Model 54B3
70446	Screw—#6-32 x ¼" long self-tapping screw to mount battery holder
70436	Socket—Tube socket
70423	Spacer—Rubber shock spacer
70428	Speaker—2" x 3" elliptical P.M. speaker
70425	Spring—Tuning knob spring clip
70426	Stud—Lid support stud
70451	Support—Lid support
70435	Support—Tube support less tube sockets and transformer
70430	Switch—Power switch (S1)
70442	Transformer—First I-F transformer (L5, L6, C8, C9)
70440	Transformer—Output transformer (T1)
70437	Transformer—Second I-F transformer (L7, L8, C11, C12)
70433	Washer—Spring washer for volume control knob
	MISCELLANEOUS ASSEMBLIES
70456	Bottom—Case bottom—54B1—Black
70988	Bottom—Case bottom—54B2—Brown
71567	Bottom—Case bottom—54B3—Red
70457	Catch—Spring catch assembly
70455	Center—Case center—Model 54B1—Black
70987	Center—Case center—Model 54B2—Brown
71566	Center—Case center—Model 54B3—Red
70459	Handle—Carrying handle—Model 54B1—Black
70989	Handle—Carrying handle—Model 54B2—Brown
71568	Handle—Carrying handle—Model 54B3—Red
70461	Link—Handle link—Model 54B1—Black (2 required)
70990	Link—Handle link—Model 54B2—Brown (2 required)
71569	Link—Handle link—Model 54B3—Red (2 required)
70458	Nameplate—"His Master's Voice" nameplate
70460	Screw—#4-40 x ⅛" fillister head screw for case center strip

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.


BOTTOM VIEW OF TUBE SOCKETS
1R5
1ST. DET. & OSC.
1T4
I.F.
1S5
2ND. DET., A.F. & A.V.C.
3S4
OUTPUT
LOOP
L1
3.6Ω
C1
10-274
C2
2-15
+60V.
+34V.
-6V. (600KC.)
-7V. (1500KC.)
R1
100 K
C4
56
GREEN
C6
7.5-122.5
C5
2-15
WHITE
L2
4Ω
L4
1Ω
BLUE
RED
1ST. I.F. TRANS.
C8
C9
L5
20Ω
L6
20Ω
BLK
C10
.02
R2
15 K
C11
2ND. I.F. TRANS.
GRN
C12
L7
39Ω
L8
39Ω
BL'K
C13
82
R5
68 K
R6
2 MEG.
VOL. CONTR.
R4
10 MEG.
C14
.002
+20V.
+3½V.
R8
4.7 MEG.
C15
.02
C19
.002
R7
1 MEG.
+60V.
-7V.
+56V
C20
.005
T1
530Ω
2Ω
10Ω
VC
P.M. SPK'R.
C7
.05
R3
3.3 MEG.
C16
33
C17
10
MFD.
R10
3.3
MEG.
1½V.
'A' BATT.
"B" BATT.
67 1/2 V.
YELLOW
YELLOW
R9
820
S1
ON LID
P-92241 -1

K=1000

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY VOLTAGE.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

ALL VOLTAGES ARE MEASURED WITH RESPECT TO CHASSIS GROUND.

Schematic Diagram.
1st Prod.—Uses 1S5 Tube

Some models do not have C2 (see information on following page)

Distortion and Low Volume:

Check C19—.002 mf. for leakage. Replace original Stock No. 70454 with Stock No. 72315.

Changes in Parts List:

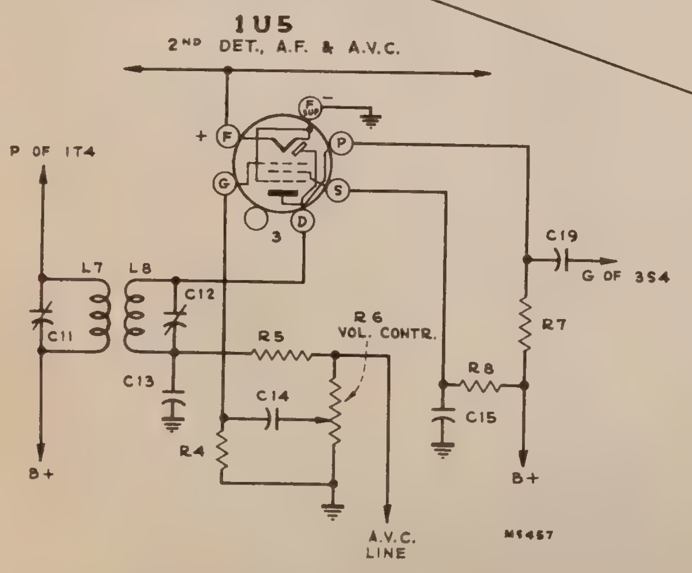
Delete Stock No. 70454—Capacitor—Tubular, .002 mfd., 150 volts (C14, C19).

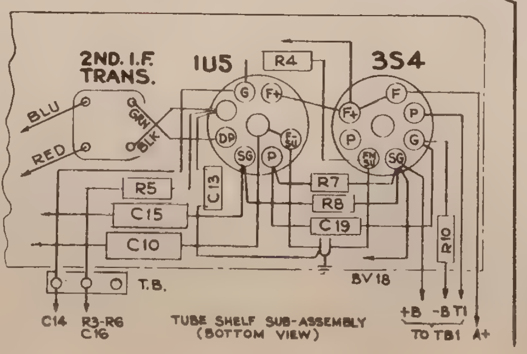
Delete Stock No. 70453—Capacitor—Tubular, .02 mfd., 100 volts (C10, C15).

Add Stock No. 72315—Capacitor—Tubular, .002 mfd., 200 volts (C14, C19).

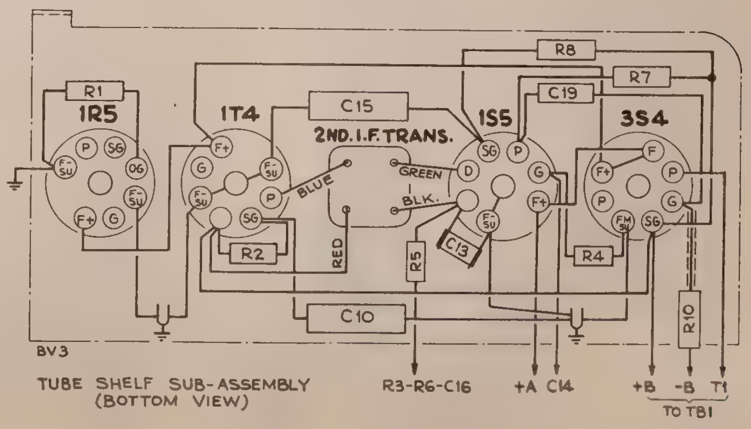
Add Stock No. 71928—Capacitor—Tubular, .02 mfd., 200 volts (C10, C15).

NOTE: C15 (Stock No. 71928) should be located adjacent to the output transformer instead of under the socket sub-panel, since its physical size is slightly larger than C15 (Stock No. 70453).


1U5
2ND DET., A.F. & A.V.C.
P OF 1T4
B+
L7
L8
C11
C12
C13
R5
R6
VOL. CONTR.
C14
R4
A.V.C. LINE
C19
G OF 3S4
R7
R8
C15
B+
M5457


2ND. I.F. TRANS.
BLU
RED
GRN
BLK
1U5
3S4
R4
R5
C15
C10
C13
R7
R8
C19
R10
T.B.
BV18
C14
R3-R6 C16
TUBE SHELF SUB-ASSEMBLY (BOTTOM VIEW)
+B -BT1
TO TB1
A+

Partial Schematic Diagram and Wiring
Chassis No. RC-589U, RC-589UA, RC-589UB


R1
1R5
1T4
C15
2ND. I.F. TRANS.
GREEN
BLK.
BLUE
RED
R2
R5
C13
1S5
R8
C19
R7
3S4
R4
C10
R10
BV3
TUBE SHELF SUB-ASSEMBLY (BOTTOM VIEW)
R3-R6-C16
+A C14
+B -B T1
TO TB1

Alignment Procedure

Test Oscillator.—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

Output Meter.—Connect meter from top lug of TB1 (plate of 3S4) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert the center strip portion of a case into a convenient shield to be used as a substitute for the regular case center strip in the RF, Osc. alignment.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C2, located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	*Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.)
6	Repeat steps 4 and 5 for final adjustments.			

* Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

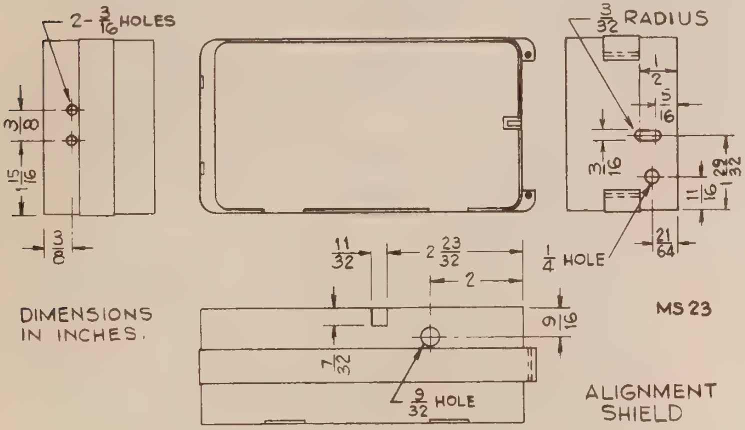


FIG. 1

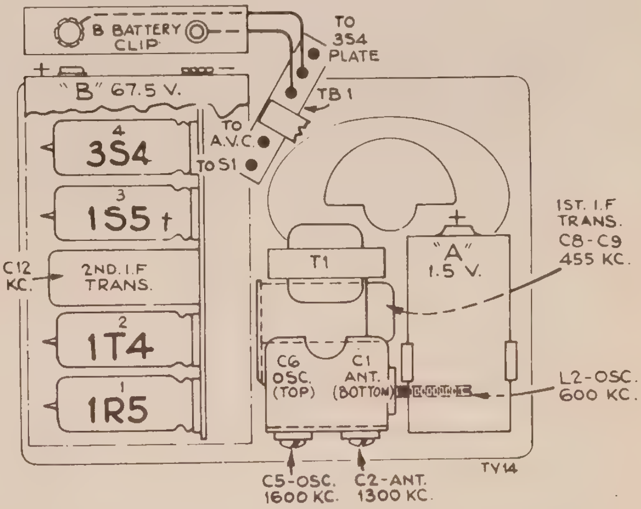
Receivers have been produced with loops of two types of construction: "taped"—coil fastened to loop cover with "scotch" tape; and "cemented"—coil fastened to loop cover with coil cement. Receivers using "cemented" loop have been produced with and without Antenna Trimmer Capacitor C2. Receivers using "taped" loop have only been produced with Antenna Trimmer Capacitor C2. The three combinations are listed below with correct alignment procedure specified. CAUTION:—A "taped" type loop should never be used as a replacement on receivers which do not have Antenna Trimmer Capacitor C2.

Loop Construction	C2 Ant. Trimmer	Alignment Procedure
TAPED	WITH	NO CHANGE (see preceding alignment table)
CEMENTED	WITH†	SEE ALIGNMENT BELOW
CEMENTED	WITHOUT	SEE ALIGNMENT BELOW

† Remove Antenna Trimmer C2 by removing C2 alignment screw and cut off C2 capacitor plate.

CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second I-F transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first I-F transformer can, keeping the green lead to the outside. Keep the blue and the green leads separated as far as possible throughout their length.
3. Dress audio coupling capacitor (C14; .002 mf.) and the lead to the volume control up and underneath the shelf supporting the output transformer.
4. Dress the three capacitors pyramided behind the speaker, parallel to the complete assembly and with enough room behind the battery holder to allow the holder to move when a battery is installed or removed.
5. Dress the "B" battery leads behind the gang frame and over the top of the output transformer.
6. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor (C17).
7. Keep blue and red leads of output transformer above the mounting shelf.



Note: DO NOT install "A" battery without cardboard cover.

A rubber band should be placed around each tube for cushioning.

† Some chassis use 1U5 tube.

Alignment Procedure For Receivers Without Antenna Trimmer C2

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C1 located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	*Antenna coupling loop thru 200 mmf. capacitor	1,500 kc	Rock gang	C5 (osc.)
4		600 kc	Rock gang	L2 (osc.)
5	Repeat steps 3 and 4 for final adjustments.			

* Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

Replacement of Component Parts

I. **To remove back cover:**

a. Depress locking spring clip through hole in top of case.

b. With spring clip depressed, pull cover carefully out and up off the locking lug in the bottom of the case.

II. **To replace batteries:**

a. Remove back cover.

b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. **To remove the case center strip:**

a. Remove one screw on the inside near the back cover.

b. Tilt case center strip and lift.

IV. **To replace tubes:**

a. Remove back cover.

b. Remove "B" battery.

c. Remove case center strip.

d. Remove and replace tubes as required.

V. **To remove the escutcheon plate (top cover):**

a. Remove the main dial knob, just pull.

b. Remove the four corner nuts (B), rear.

c. The plate may either be removed from the stay arm or folded into the lid.

VI. **To remove speaker:**

a. Remove escutcheon plate (see item V above).

b. Remove two Phillips screws (C) on chassis front of panel assembly holding speaker.

c. Unsolder voice coil leads.

d. Slide forward away from hinge side.

VII. **To remove output transformer:**

a. Remove speaker (see item VI).

b. Remove rivet (when replacing use small brass bolt).

c. Unsolder mounting lug and leads.

d. Pull transformer out.

VIII. **To remove volume control:**

a. Remove speaker (item VI).

b. Unsolder (disconnect) lead to positive terminal of "A" battery holder.

c. Lift up the "A" battery holder by removing the one screw in its base. This holder has a hinge action and must be lifted up and back to remove.

d. Remove front plate (panel) as follows:

1. Unsolder two copper strips (E) (from end of tube shelf to front plate) located under tubes 1R5 3S4.
2. Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5 or 1U5. Rubber shock mounts may stick on studs, pry loose.
3. Remove nut (G) beneath tube shelf below second I-F transformer.
4. Remove screw (G) beneath the negative terminal of "A" battery holder, near cover hinge and also screw (G) adjacent to volume control below "A" battery holder near release catch.
5. Unsolder three chassis leads to cover switch assembly or remove the switch assembly from the front cover plate.
6. Lay chassis on board or jig.
7. Remove front plate.
8. Unsolder volume control leads.
9. Remove volume control knob and spider.
10. Remove volume control assembly by bending back four lugs.

Caution: Do not close lid unless center screw of switch assembly is in place.

e. Reassemble in reverse order.

IX. **To remove oscillator coil:**

a. Same procedure and steps as covered in item VIII for removal of volume control plus the following.

b. Unsolder oscillator coil leads.

c. Remove coil by unsnapping spring mounting clips from angle bracket.

X. **To remove 1st I-F transformer:**

a. Remove speaker.

b. Unsolder four leads from 1st I-F transformer.

1. Blue to plate (screen used as plate) of 1R5 tube.
2. Green to grid of 1T4 tube.
3. Red to B+ terminal of 5 lug terminal board adjacent to output transformer.
4. Black to AVC terminal of same strip as above.

c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.

d. Unsolder and bend mounting lugs straight on the I-F transformer can. These lugs are immediately below the 2nd I-F transformer on tube shelf.

e. Slip 1st I-F transformer forward toward volume control and out.

Note: It is possible to fold the 1st I-F transformer out the front of the chassis if the front plate is removed. This will eliminate the unsoldering of leads from the two lug terminal board.

XI. **To remove 2nd I-F transformer:**

a. Carefully remove the two 0.02 mfd. (C10, C15) capacitors.

b. Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these lugs from the tube mounting shelf and bend out.

c. Unsolder the blue (plate of 1T4), green (diode of 1S5 or 1U5), red (B+ on terminal board), and black leads.

d. Remove 2nd I-F transformer.

XII. **To remove condenser tuning gang:**

a. Loosen oscillator coil.

b. Unsolder leads to tuning gang.

c. Unsolder grounding straps.

d. Remove three screws holding gang assembly to chassis.

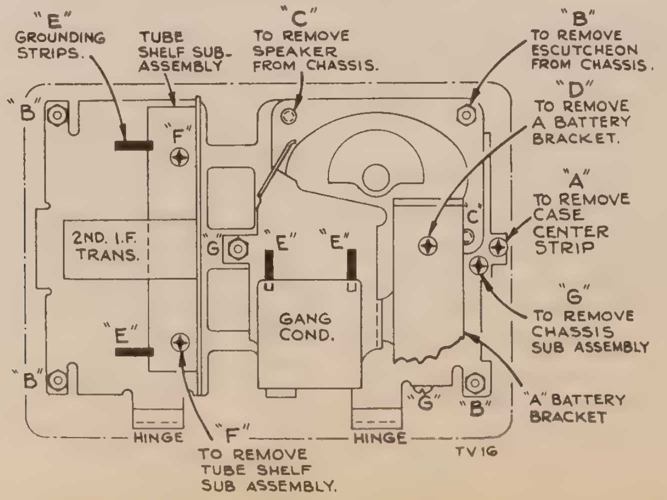
e. Remove gang from rear of chassis.

XIII. **To remove loop assembly:**

a. Unsolder loop leads in chassis.

b. Remove screw holding fish paper insulating envelope to chassis switch.

c. Remove snap fasteners holding loop in cover.


"E" GROUNDING STRIPS.
TUBE SHELF SUB-ASSEMBLY
"C" TO REMOVE SPEAKER FROM CHASSIS.
"B" TO REMOVE ESCUTCHEON FROM CHASSIS.
"D" TO REMOVE A BATTERY BRACKET.
"A" TO REMOVE CASE CENTER STRIP
"G" TO REMOVE CHASSIS SUB ASSEMBLY
"A" BATTERY BRACKET
"B"
"F"
2ND. I.F. TRANS.
"G"
"E"
"E"
"C"
"E"
GANG COND.
"B"
"G"
"B"
HINGE
"F" TO REMOVE TUBE SHELF SUB ASSEMBLY.
HINGE
TV16

RCA VICTOR

54B5

Chassis No. RC1047; Mfr. No. 274

SERVICE DATA

—1946 No. 15—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range......................................550-1,600 kc

Intermediate Frequency......................................455 kc

Power Supply

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt RCA-VS 036 or VS 001	0.25 amperes	5-6 hours
"B"—67.5 volts RCA-VS 016	8.5 milliamperes	25-40 hours

Power Output.......Undistorted 0.05 watts.......Maximum 0.12 watts

Loudspeaker
Type Permanent-Magnet Dynamic Elliptical..................2 x 3 in.

Voice Coil Impedance........................11¾ ohms at 1000 cycles

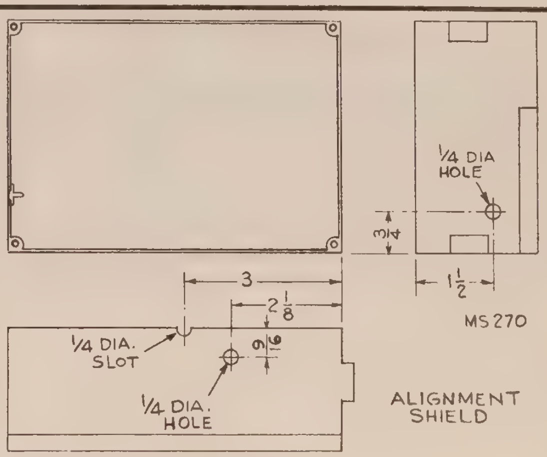


Fig. 1

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1047
70423	Band—Rubber band for tubes
70444	Board—Speaker terminal board (5 contact)
70445	Board—Terminal board (1 contact)
33111	Capacitor—Ceramic, 33 mmf. (C16)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71514	Capacitor—Ceramic, 82 mmf. (C13)
72315	Capacitor—Tubular, .002 mfd., 150 volts (C14, C19)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)
70453	Capacitor—Tubular, .02 mfd., 100 volts (C10, C15)
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)
72215	Coil—Loading coil (L3)
70443	Coil—Oscillator coil (L2, L4)
72227	Condenser—Variable tuning condenser (C1, C2, C5, C6)
72228	Control—Volume control (R6)
70429	Grommet—Rubber grommet to mount tube support assembly (2 required)
72229	Holder—Battery holder
72225	Insulator—Insulator for chassis panel
72226	Knob—Volume control knob
72224	Panel—Front panel
14076	Resistor—820 ohms, ¼ watt (R9)
36714	Resistor—15,000 ohms, ¼ watt (R2)
14138	Resistor—68,000 ohms, ¼ watt (R5)
3252	Resistor—100,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R7)
31417	Resistor—3.3 megohms, ¼ watt (R3, R10)
30931	Resistor—4.7 megohms, ¼ watt (R8)
30992	Resistor—10 megohms, ¼ watt (R4)
70527	Screw—#6-32 x 5/16" set screw for volume control knob
70436	Socket—Tube socket
72230	Support—Tube support less tube socket and transformer
72895	Switch—Power switch complete with mounting bracket—less leads (S1)
70440	Transformer—Output transformer (T1)
70442	Transformer—First I. F. transformer (L5, L6, C8, C9)
70437	Transformer—Second I. F. transformer (L7, L8, C11, C12)
	SPEAKER ASSEMBLY 92523-3W RL95-4
70428	Speaker—2 x 3" P.M. speaker complete with cone and voice coil NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72233	Back—Case back
72783	Case—"Jewel Box" case including divider strip and rubber pads—less front cover
72784	Cover—Front cover and screen assembly
72235	Handle—Carrying handle
72232	Knob—Tuning knob
72234	Link—Link for carrying handle (2 required)
72237	Mounting—One set of hardware to mount chassis
72242	Screen—Front cover screen only
72240	Screw—Drive screws for Divider strip and front panel (total of 4 required)
72236	Screw—Flat head screw for mounting loop (4 required)
70425	Spring—Tuning knob spring clip
72239	Strip—Divider strip

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List:

STOCK NO.:
73068 Loop—Antenna loop and frame assembly (L1)

Replacement of Component Parts

I. To remove tubes:
- a. Slide back cover towards handle.
- b. Remove both batteries.
- c. Pry tubes out of sockets by gently wedging small screwdriver between base of tubes and sockets.

II. To replace batteries:
- a. Slide back cover towards handle.
- b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. To remove loop:
- a. Remove "A" and "B" batteries (see item II).
- b. Unsolder loop leads from terminals on battery holder.
- c. Remove four mounting screws "B" in the four corners as indicated in fig. 2 and lift off.

IV. To remove chassis:
- a. Remove loop.
- b. Remove the two screws "H" holding the switch bracket.
- c. Remove the two chassis mounting screws "A", fig. 2.

V. To remove speaker
- a. Remove volume control knob by loosening set screw and pull.
- b. Unsolder voice coil leads, and remove the two mounting screws "C", fig. 2.
- c. Slide speaker out.

VI. To remove output transformer:
- a. Remove speaker and keep it clear of metal particles.
- b. Drill out mounting rivet, and bend tabs (when replacing use small screw).
- c. Unsolder leads and lift out.

VII. To remove chassis mounting plate:
- a. Unsolder copper strip under 3S4 tube.
- b. Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5. Rubber shock mounts may stick on studs, pry loose.
- c. Remove nut (G) beneath tube shelf below second I-F transformer.
- d. Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.
- e. Carefully invert the chassis.
- f. Remove volume control wheel (loosen set screw and pull off).
- g. Lift the mounting plate off.

VIII. To remove volume control:
- a. Remove "A" battery holder.
- b. Unsolder volume control leads.
- c. Remove chassis mounting plate (see item VII).
- d. Remove volume assembly by bending tabs and lifting out.

IX. To remove oscillator coil:
- a. Remove battery holder.
- b. Remove chassis mounting plate.
- c. Unsolder oscillator coil leads.
- d. Remove coil by unsnapping spring mounting clips from angle bracket.

X. To remove 1st I-F transformer:
- a. Remove speaker.
- b. Unsolder four leads from 1st I-F transformer.
  1. Blue to plate of 1R5 tube.
  2. Green to grid of 1T4 tube.
  3. Red to B + terminal of 5 lug terminal board adjacent to output transformer.
  4. Black to AVC terminal of same strip as above.
- c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.
- d. Unsolder and bend mounting tabs straight on the I-F transformer can. These tabs are immediately below the 2nd I-F transformer on tube shelf.
- e. Slip 1st I-F transformer forward toward volume control and out.

  Note: It is possible to fold the 1st I-F transformer out the front of the chassis if the front plate is removed. This will eliminate the unsoldering of leads from the two lug terminal board.

XI. To remove 2nd I-F transformer:
- a. Carefully remove the two 0.02 uf C10, C15 capacitors.
- b. Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these tabs from the tube mounting shelf and bend out.
- c. Unsolder the blue (plate of 1T4), green (grid of 1S5), red (B+ on terminal board), and black leads.
- d. Remove 2nd I-F transformer.

XII. To remove tuning condenser:
- a. Remove chassis mounting plate (see item VII).
- b. Unsolder leads to tuning gang.
- c. Loosen loading coil if necessary.
- d. Remove two mounting screws and lift out.

Tools required:
1. One Phillips No. 1 screwdriver.
2. One small insulated alignment tool.
3. Allen wrench for a #6 set screw. (Use to remove volume control wheel.)

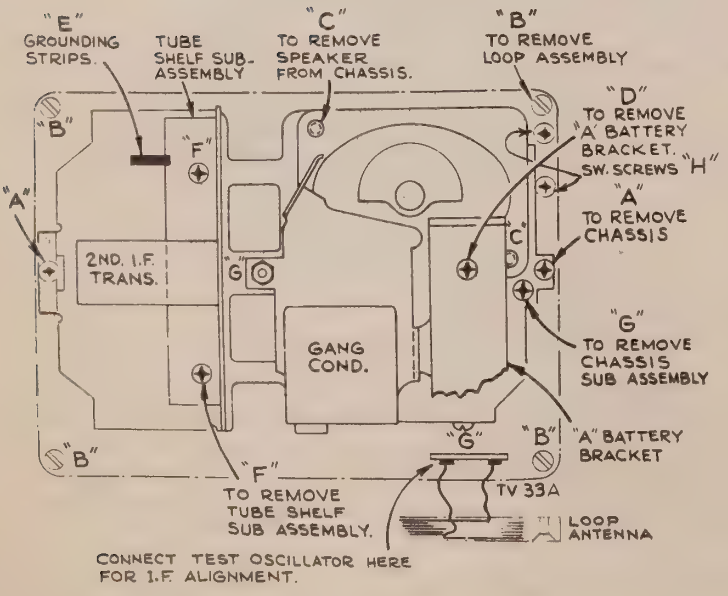

"E" GROUNDING STRIPS.
TUBE SHELF SUB-ASSEMBLY
"C" TO REMOVE SPEAKER FROM CHASSIS.
"B" TO REMOVE LOOP ASSEMBLY
"D" TO REMOVE 'A' BATTERY BRACKET.
SW. SCREWS "H"
"A" TO REMOVE CHASSIS
"B"
"F"
"A"
2ND. I.F. TRANS.
G
C
GANG COND.
"G" TO REMOVE CHASSIS SUB ASSEMBLY
"B"
"G"
"B"
"A" BATTERY BRACKET
"F" TO REMOVE TUBE SHELF SUB ASSEMBLY.
TV 33A
LOOP ANTENNA
CONNECT TEST OSCILLATOR HERE FOR I.F. ALIGNMENT.

Fig. 2

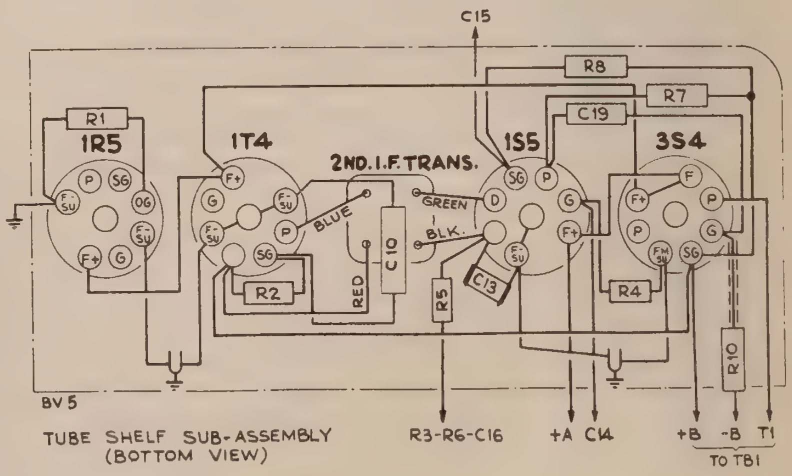

C15
R8
R7
C19
R1
1R5
1T4
2ND. I.F. TRANS.
1S5
3S4
P
SG
F-SU
OG
F+
G
BLUE
GREEN
BLK.
RED
C10
D
R2
R5
C13
R4
FM SU
R10
BV 5
TUBE SHELF SUB-ASSEMBLY (BOTTOM VIEW)
R3-R6-C16
+A
C14
+B
-B
T1
TO TB1

Fig. 3

Alignment Procedure

Test Oscillator.—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

Output Meter.—Connect a high resistance AC voltmeter in series with a .1 mfd capacitor from top lug of terminal board TB1 (3S4 plate—refer to Fig. 4) to chassis. Turn volume control to maximum position.

Alignment Shield.—Fig. 1 shows the modifications necessary to convert a case into a convenient shield to be used as a substitute for the regular case in the Ant. Osc. alignment.

When using the dummy case for the osc. alignment, the loop assembly must be raised slightly so that osc. trimmer becomes accessible.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	lug of C2, (located on rear of gang) through a .01 mfd. capacitor	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	**Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.) (Rock gang)
6	Repeat steps 4 and 5 for final adjustments.			

*The IF transformers can be aligned with chassis out of case.

**Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the back. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second IF transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first IF transformer can, keeping the green lead to the outside. Load coil bracket is to separate the blue and the green leads.
3. Dress audio coupling capacitor C14 and the lead to the volume control up and underneath shelf supporting the output transformer.
4. Wire in the three capacitors pyramided behind the speaker with enough space behind the battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting the off-on switch.
5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor C17.
6. Keep blue and red leads of output transformer above the mounting shelf.
7. Dress all leads as far as possible from loading coil.
8. Dress leads to gang as far as possible from all metal parts.
9. Dress loop leads to keep from interfering with battery replacement.

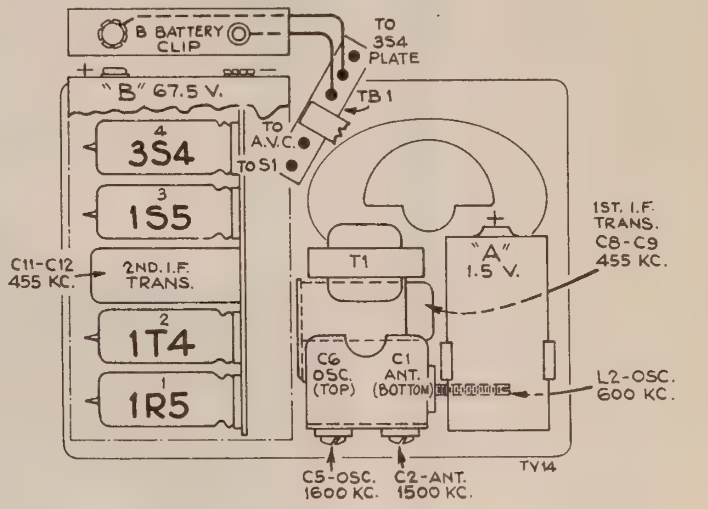
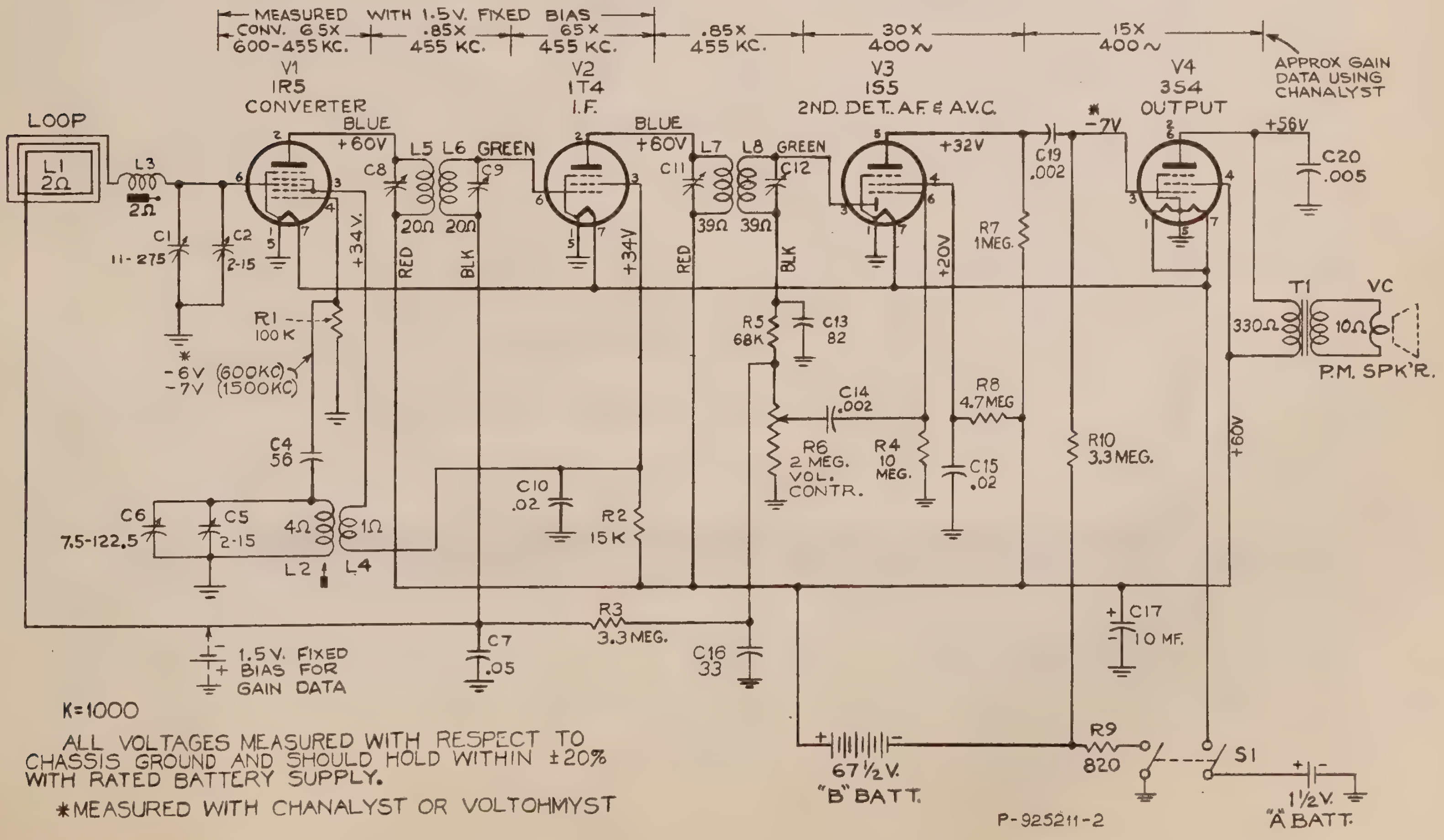

B BATTERY CLIP
TO 3S4 PLATE
TB 1
"B" 67.5 V.
TO A.V.C.
TO S1
4 3S4
3 1S5
2ND. I.F. TRANS.
2 1T4
1 1R5
C11-C12 455 KC.
T1
"A" 1.5 V.
1ST. I.F. TRANS. C8-C9 455 KC.
C6 OSC. (TOP)
C1 ANT. (BOTTOM)
L2-OSC. 600 KC.
C5-OSC. 1600 KC.
C2-ANT. 1500 KC.
TV14

Fig. 4

NOTE:

A rubber band should be placed around each tube for cushioning. Dirty tube contacts may be mistaken for a defective tube.


MEASURED WITH 1.5V. FIXED BIAS
CONV. 6.5X 600-455KC.
.85X 455 KC.
65X 455 KC.
.85X 455 KC.
30X 400~
15X 400~
APPROX GAIN DATA USING CHANALYST
V1 1R5 CONVERTER
V2 1T4 I.F.
V3 1S5 2ND. DET. A.F. & A.V.C.
V4 3S4 OUTPUT
LOOP
L1 2Ω
L3
2Ω
BLUE
+60V
L5 L6 GREEN
C8 C9
20Ω 20Ω
RED BLK
+34V
BLUE
+60V
L7 L8 GREEN
C11 C12
39Ω 39Ω
RED BLK
+32V
+20V
C19 .002
*-7V
+56V
C20 .005
R7 1MEG.
C1 11-275
C2 2-15
R1 100K
* -6V (600KC) -7V (1500KC)
C4 56
C6 7.5-122.5
C5 2-15
4Ω 1Ω
L2 L4
C10 .02
R2 15K
R5 68K
C13 82
C14 .002
R8 4.7MEG
R6 2 MEG. VOL. CONTR.
R4 10 MEG.
C15 .02
R10 3.3 MEG.
+60V
T1 VC
330Ω 10Ω
P.M. SPK'R.
R3 3.3 MEG.
C7 .05
C16 33
+ C17 10 MF.
1.5V. FIXED BIAS FOR GAIN DATA
67½V. "B" BATT.
R9 820
S1
1½V. "A" BATT.
P-925211-2

K=1000

ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS GROUND AND SHOULD HOLD WITHIN ±20% WITH RATED BATTERY SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST

DON'T LOOK ANY FURTHER!

FIND YOUR ANSWER IN *RCA Victor*

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RCA Victor
SERVICE DATA
RCA VICTOR SERVICE DATA
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VOL. II
VOLUME I
1923 1937
1938
RADIO CORPORATION OF AMERICA
RCA Victor Division Camden, N.J., U.S.A.

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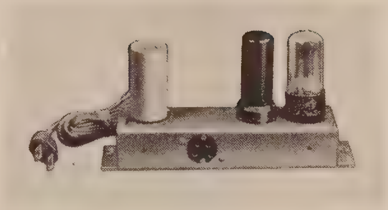
Model 55F



CV-42 Electrifier

RCA VICTOR

55F and CV-42 Electrifier

(RC-1004E) Mfr. No. 274 (RS 1000)

SERVICE DATA

—1945 No. 5—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

CIRCUIT DESCRIPTION.—Superheterodyne with one stage of radio frequency amplification, automatic volume control and class "A" beam power output. Battery operation, with optional AC-DC socket power attachment available. Model 55F can be operated on 105-125 volts AC, 50-60 cycles, or 105-125 DC, by means of an RCA CV-42 Electrifier.

FREQUENCY RANGE......................................540-1,720 kc

INTERMEDIATE FREQUENCY......................................455 kc

MAXIMUM POWER OUTPUT......................................3 watt

LOUDSPEAKER (5 inch) 92515-1
Voice coil impedance at 400 cycles..............................3.4 ohms

POWER SUPPLY
Battery..................................RCA VS022 or equivalent
Battery Drain
"A" 1½ volt section..3 ampere
"B" 90 volt section.......10 m.a. (Switch in "Battery Saver Position")
14 m.a. (Maximum Output Position)

POWER CONSUMPTION
With CV-42 Electrifier Unit (switch in "Electric" position).....22.5 watts
Cabinet Dimensions (inches)..........................18 x 9¼ x 10$\frac{9}{16}$

IMPORTANT

Remove any external ground connections when using the Electrifier.
CAUTION: Turn power switch off (counter-clockwise) when installing or replacing tubes or batteries.

RECEIVER IS SHIPPED READY FOR BATTERY OPERATION. FOR ELECTRIFIER OPERATION, REMOVE TAPE FROM LUG AT REAR OF CHASSIS AND CONNECT LUG TO CHASSIS.

On a DC power supply, if no reception is obtained, reverse the plug in the outlet and retune. On an AC supply, reversal of the plug may reduce hum. CAUTION! Do not touch Radio Chassis unless power plug is removed from socket.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 1004E**
38675	Arm—"On-Off" indicator arm
39604	Capacitor—Mica, 10 mmf. (C40)
38672	Capacitor—Mica trimmer, 1 section 120 mmf. 1 section 45-80 mmf. (C21, C22)
39640	Capacitor—Mica, 330 mmf. (C6)
70627	Capacitor—Paper, .005 mfd., 1200 volts (C7, C8, C19)
70712	Capacitor—Paper, .0018 mfd., 700 volts (C5)
70615	Capacitor—Paper, .05 mfd., 200 volts (C2)
70617	Capacitor—Paper, 0.1 mfd., 400 volts (C1)
36718	Capacitor—Electrolytic, 10 mfd., 10 volts (C18, C23)
38705	Capacitor—Electrolytic, 25 mfd., 90 volts (C20)
38344	Coil—Antenna coil (L1, L2)
38345	Coil—Oscillator coil (L3, L4)
70378	Coil—Wave trap (L10, L11)
38599	Condenser—Variable tuning condenser (C9, C10, C11, C17)
36080	Control—Volume control and power switch (R6, S1, S2)
34662	Cord—Drive cord (approx. 59" overall length)
38821	Dial—Dial scale
35069	Fastener—Push fastener for dial plate
36090	Indicator—Station selector indicator
38350	Lever—Indicator arm actuating lever
38673	Plate—Dial back plate complete with drive cord pulleys and indicator arm
30550	Plug—4 prong male plug for battery cable
32289	Pulley—Drive cord pulley
39930	Resistor—22 ohms, 1 watt (R17)
30498	Resistor—390 ohms, ¼ watt (R10, R11)
12262	Resistor—680 ohms, ¼ watt (R14)
30734	Resistor—5600 ohms, ¼ watt (R12)
30787	Resistor—47,000 ohms, ¼ watt (R5)
14138	Resistor—68,000 ohms, ¼ watt (R3)
14583	Resistor—220,000 ohms, ¼ watt (R2)
30652	Resistor—1 megohm, ¼ watt (R8)
30649	Resistor—2.2 megohm, ¼ watt (R9)
12928	Resistor—3.3 megohm, ¼ watt (R1, R13)
30992	Resistor—10 megohm, ¼ watt (R4, R7)
36897	Shaft—Tuning knob shaft
70377	Shield—Tube shield for IN5GT/G and IH5GT/G tubes
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
38349	Spring—Indicator arm return spring
38670	Switch—"Battery-Electric" power switch (S3, S4)
70379	Transformer—First I.F. transformer (L5, L6, C12, C13)
70380	Transformer—Second I.F. transformer (L7, L8, C3, C4, C14, C15)
33726	Washer—"C" for tuning knob shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES Stamped 92515-1K
70381	Speaker—5" P.M. speaker less output transformer
70991	Transformer—Output transformer
	SPEAKER ASSEMBLIES Stamped 92515-1P
70381	Speaker—5" P.M. speaker less output transformer
70992	Transformer—Output transformer
	SPEAKER ASSEMBLIES Stamped 92515-1F
70381	Speaker—5" P.M. speaker less output transformer
70993	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
X1606	Board—Baffle board and grille cloth
36462	Clamp—Dial clamp
35915	Escutcheon—Dial escutcheon less dial
36886	Knob—Power switch knob
36722	Knob—Tuning or Volume control knob
30900	Spring—Retaining spring for knob
38679	Window—Glass window for dial scale
	CV-42 ELECTRIFIER
38702	Ballast—Plug-in ballast tube resistor
38701	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, 1 section of 30 mfd., 150 volts, and 1 section of 250 mfd., 10 volts
30847	Capacitor—.05 mfd., 400 volts
28451	Cover—Insulating cover for electrolytic capacitor
35069	Fastener—Push fastener for bottom cover
28452	Plate—Bakelite mounting plate for electrolytic capacitor
38702	Resistor—Ballast tube resistor
30730	Resistor—2,700 ohms, ½ watt
31027	Socket—Power output socket
31251	Socket—Tube or ballast resistor socket
38702	Tube—Ballast tube resistor

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscillograph are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

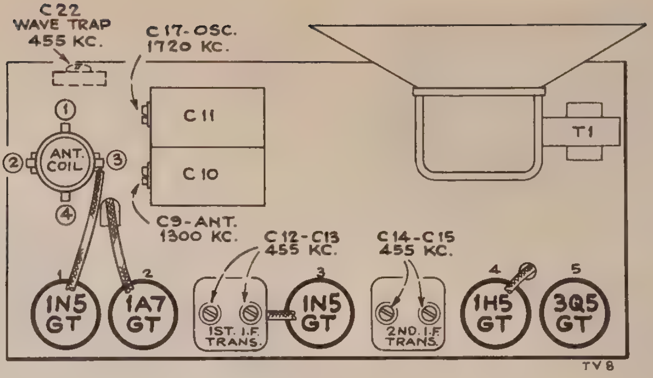
Step	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid in series with .01 mfd.	455 kc	Quiet point between 550 and 750 kc	C14, C15. (2nd I-F Trans.)
2	1A7GT grid in series with .01 mfd.			C12, C13 (1st I-F Trans.)
3	Antenna terminal in series with 200 mmfd.	1,720 kc	Tuning condenser rotor plates all out	C17 (osc.)
4		1,300 kc	1,300 kc signal	C9 (ant.)
5		455 kc	Quiet point between 550 and 750 kc	Adjust C22 for minimum output on strong 455 kc signal

Precautionary Lead Dress.—

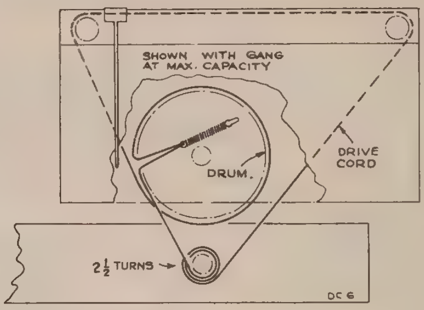
1. The lead from the 3Q5 plate to output transformer should be dressed under clip and away from audio input leads.
2. All filament wires should be dressed close to chassis.
3. Keep AVC lead connecting C1, (0.1 mfd. filter) to antenna coil away from the 1A7GT plate.
4. Keep blue plate leads coming from I.F. transformers short and close to chassis.
5. Keep yellow leads connecting to oscillator coil away from trap coil.
6. Keep grid lead of 1N5GT RF tube away from 1A7GT grid.
7. Keep green lead from second I.F. transformer short and close to ground.

Capacitor on Oscillator Coil

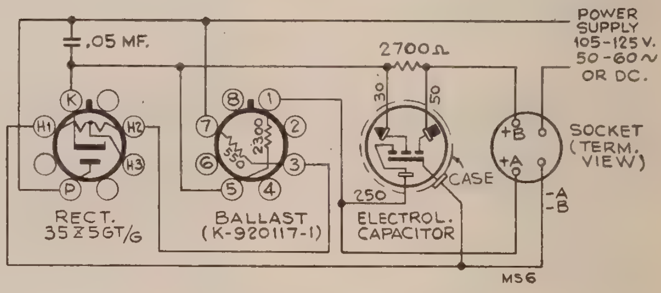
Some sets have a 56 mmf. capacitor from terminal #13 to #9. This is not necessary on replacement coils as they have a built-in capacity winding.


C22
WAVE TRAP
455 KC.
C17-OSC.
1720 KC.
C11
C10
T1
ANT. COIL
①
②
③
④
C9-ANT.
1300 KC.
C12-C13
455 KC.
C14-C15
455 KC.
1
2
3
4
5
1N5 GT
1A7 GT
1ST. I.F. TRANS.
1N5 GT
2ND. I.F. TRANS.
1H5 GT
3Q5 GT
TV8

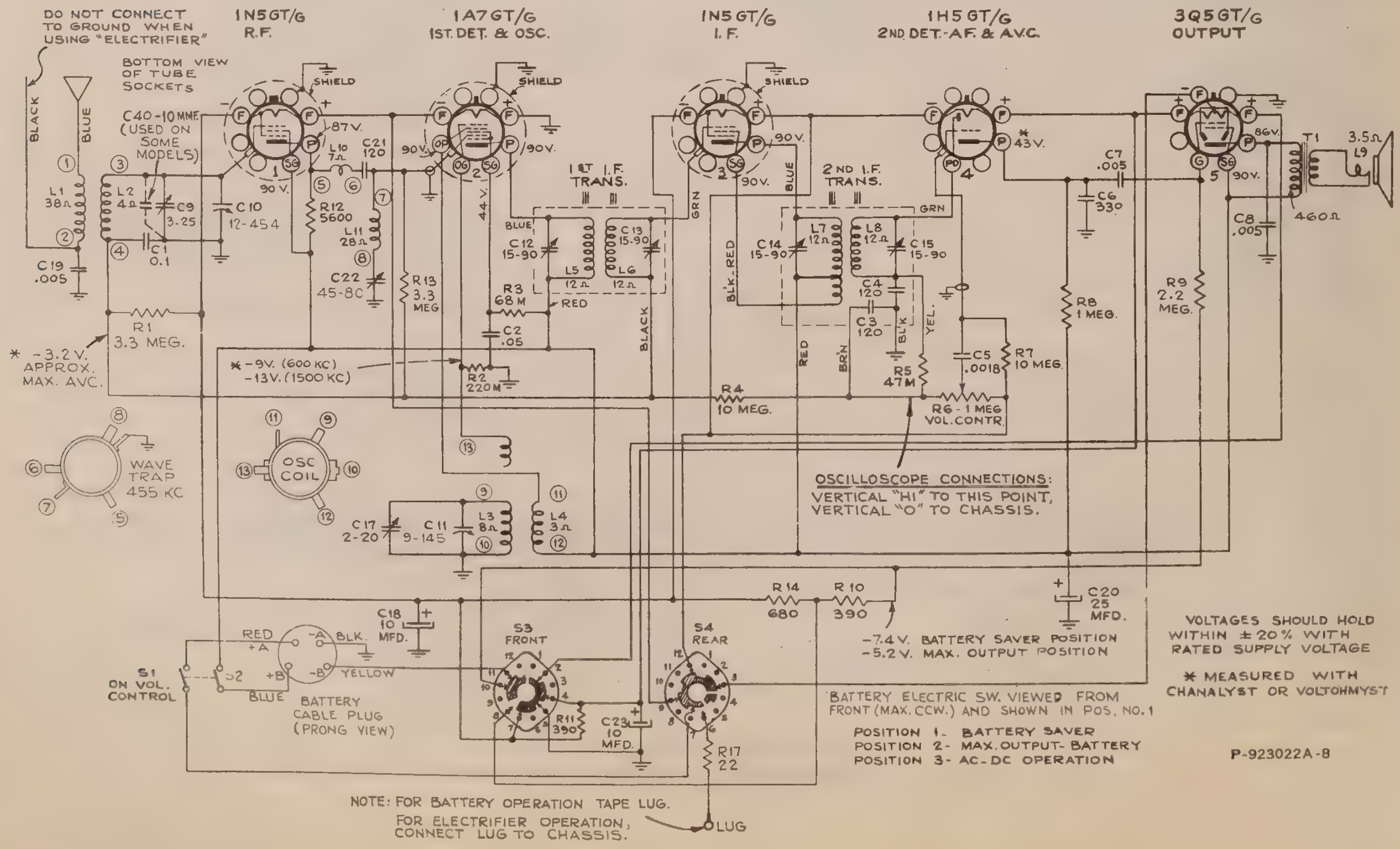
Top·View


SHOWN WITH GANG AT MAX. CAPACITY
DRUM.
DRIVE CORD
2½ TURNS
DC 6

Dial Cord Assembly


POWER SUPPLY
105-125 V.
50-60 ~
OR DC.
.05 MF.
2700 Ω
K
H1
H2
H3
P
RECT.
35Z5GT/G
⑧ ① ② ③ ④ ⑤ ⑥ ⑦
2300
BALLAST
(K-920117-1)
30
50
250
CASE
ELECTROL. CAPACITOR
+B
+A
SOCKET
(TERM. VIEW)
-A
-B
MS6

Electrifier Schematic


DO NOT CONNECT TO GROUND WHEN USING "ELECTRIFIER"
1N5GT/G
R.F.
1A7GT/G
1ST. DET. & OSC.
1N5GT/G
I. F.
1H5GT/G
2ND DET.-AF. & AVC.
3Q5GT/G
OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
BLACK
BLUE
C40-10 MMF. (USED ON SOME MODELS)
SHIELD
87V.
90V.
L1
38Ω
L2
4Ω
C9
3-25
C1
0.1
C10
12-454
C19
.005
R12
5600
L10
7Ω
C21
120
L11
28Ω
C22
45-80
R13
3.3 MEG
44V.
R3
68 M
C2
.05
1ST I.F. TRANS.
C12
15-90
C13
15-90
L5
12Ω
L6
12Ω
RED
BLUE
GRN
BLACK
2ND I.F. TRANS.
C14
15-90
L7
12Ω
L8
12Ω
C15
15-90
C4
120
C3
120
BLK.-RED
BRN
YEL.
43V.
C7
.005
C6
330
R8
1 MEG.
C5
.0018
R7
10 MEG.
R5
47M
R6-1 MEG VOL. CONTR.
R4
10 MEG.
86V.
T1
3.5Ω
L9
460Ω
C8
.005
R9
2.2 MEG.
R1
3.3 MEG.
* -3.2 V. APPROX. MAX. AVC.
* -9V. (600 KC)
-13V. (1500 KC)
R2
220M
WAVE TRAP 455 KC
OSC COIL
⑥ ⑦ ⑧ ⑤ ⑨ ⑩ ⑪ ⑫ ⑬
C17
2-20
C11
9-145
L3
8Ω
L4
3Ω
OSCILLOSCOPE CONNECTIONS: VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
R14
680
R10
390
C20
25 MFD.
-7.4 V. BATTERY SAVER POSITION
-5.2 V. MAX. OUTPUT POSITION
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY VOLTAGE
* MEASURED WITH CHANALYST OR VOLTOHMYST
C18
10 MFD.
RED
BLK.
+A
-A
+B
-B
YELLOW
BLUE
S1
ON VOL. CONTROL
BATTERY CABLE PLUG (PRONG VIEW)
S3
FRONT
S4
REAR
R11
390
C23
10 MFD.
R17
22
BATTERY ELECTRIC SW. VIEWED FROM FRONT (MAX. CCW.) AND SHOWN IN POS. NO. 1
POSITION 1- BATTERY SAVER
POSITION 2- MAX. OUTPUT- BATTERY
POSITION 3- AC-DC OPERATION
P-923022A-8
NOTE: FOR BATTERY OPERATION TAPE LUG.
FOR ELECTRIFIER OPERATION, CONNECT LUG TO CHASSIS.
LUG

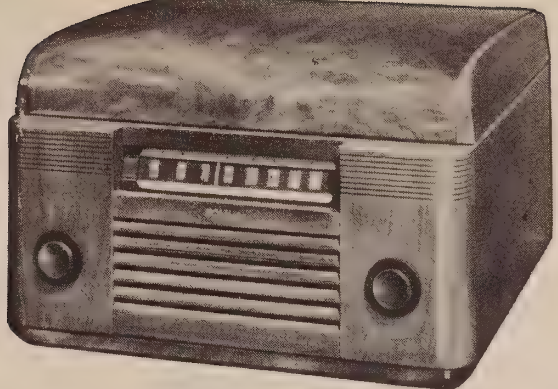
RCA VICTOR

55U, 55AU
VICTROLA
Radio-Phonograph Combination
Chassis No. RC1017; Mfr. No. 274

SERVICE DATA

—1945 No. 4—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



Model 55U, 55AU

Electrical and Mechanical Specifications

FIVE-TUBE, SINGLE-BAND, SUPERHETERODYNE RECEIVER

FREQUENCY RANGE	540-1,600 kc
INTERMEDIATE FREQUENCY	455 kc

POWER OUTPUT

Undistorted	1.5 watts
Maximum	2.4 watts

LOUDSPEAKER (922279-1) "PM"

Size	4 x 6 inch elliptical
V.C. Impedance	3.4 ohms at 400 cycles
Some models may have	5 inch Round PM

POWER SUPPLY RATING

105-125 volts, AC, 60 cycles	60 watts

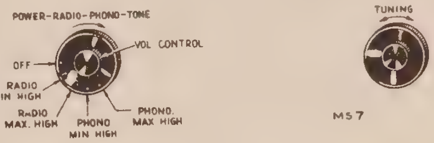
IMPORTANT—Do not plug chassis into a d.c. power supply.

REFER TO SERVICE DATA FOR MODEL 960015 FOR INFORMATION AND PARTS ON RECORD CHANGER

	Height	Width	Depth
Cabinet dimensions (inches)	10½	17¼	17¼
Chassis overall (inches)	6⅝	14	6¼
Chassis base (inches)	1⅝	14	3¾
Tuning Drive Ratio			15:1

PHONOGRAPH

Type	Automatic (960015)
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable Speed	78 r.p.m.
Type Pickup	Crystal
Motor Power Consumption	25 watts



Control Positions

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY (RC 1017)
70389	Bearing—Tuning knob shaft bearing
70407	Button—Plug button (2 required)
70997	Capacitor—Ceramic, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
70408	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C12, C13)
70403	Coil—Oscillator coil
70383	Condenser—Variable tuning condenser complete with drum (C18, C16)
72756	Control—Volume control, 0.5 megohms (R10)
32634	Cord—Drive cord (approx. 48″ overall length)
70392	Cord—Power cord
70384	Drum—Drive drum
70397	Gear—Power or radio-phono switch gear
70395	Gear—Volume control gear and spring assembly
70404	Indicator—Station selector indicator
70391	Insulator—Bakelite insulator for phono input socket
11765	Lamp—Dial lamp
70393	Loop—Antenna loop (L1, L2)
70382	Plate—Dial back plate complete with pulleys less dial
30868	Plug—2 contact female plug for AC cable
36230	Pulley—Drive cord pulley
30880	Resistor—150 ohms, ¼ watt (R7)
6134	Resistor—1200 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1, R5)
30648	Resistor—470,000 ohms, ¼ watt (R8)
12928	Resistor—3.3 megohm, ¼ watt (R4)
31455	Resistor—5.6 megohm, ¼ watt (R6)
14974	Screw—#8-32 x 3/16″ long set screw for lower gear
70388	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket—moulded
70394	Switch—Power or radio phono switch (S1)
70386	Transformer—First I.F. transformer (L6, L7; C20, C21)
70387	Transformer—Second I.F. trans. (L8, L9; C22, C23; C6, C7)
70385	Transformer—Output transformer
33726	Washer—"C" washer for tuning knob shaft
70406	Washer—Spring washer for volume control
	ELLIPTICAL SPEAKER ASSEMBLY 922279-1
70405	Speaker—4″ x 6″ PM with cone and voice coil
X1605	Board—Baffle board and grille for elliptical speaker
	ROUND SPEAKER ASSEMBLY 92510-1
70413	Speaker—5″ Round PM with cone and voice coil
X1613	Board—Baffle board and grille for round speaker
	NOTE: Order speaker by number stamped on speaker, referring also to model number of instrument, and description of part.
	MISCELLANEOUS ASSEMBLIES
70398	Clamp—Dial clamp (1 set)
35392	Decal—Trademark decal (RCA Victor)
70575	Decal—Trademark decal (Dog)
70402	Dial—Dial scale
71595	Foot—Rubber foot for cabinet (4 required)
70707	Hinge—Cabinet lid hinge (2 required)
70401	Knob—Power or radio-phono switch knob
70400	Knob—Tuning knob
70399	Knob—Volume control knob
70390	Spring—Drive cord tension spring
70396	Spring—Retaining spring for power-radio-phono switch knob
14270	Spring—Retaining spring for tuning and volume control knob
71824	Stud—Stud and screw to mount lid hinge (1 set)
39545	Support—Lid support

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

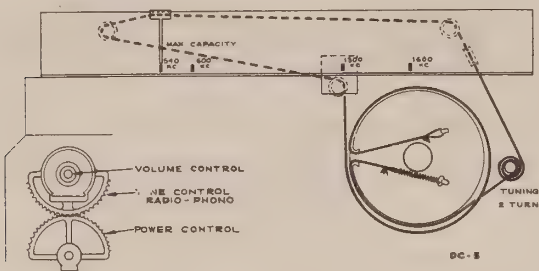
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.


MAX CAPACITY
540 KC
600 KC
1500 KC
1600 KC
VOLUME CONTROL
TONE CONTROL RADIO - PHONO
POWER CONTROL
TUNING 2 TURNS
DC-5

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise plates (fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

Output Transformer Color Coding.—On some models the lead coloring on the output transformer may not correspond with the coloring given on the schematic. It is therefore necessary to rely on resistance measurements to determine lead connections, rather than the color coding given in the schematic.

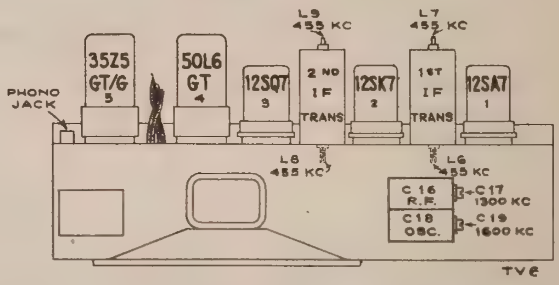
Capacitor on Oscillator Coil.—Some sets have a 56 mmf. capacitor from terminal #8 to #5. This is not necessary on replacement coils as they have a built-in capacity winding.

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B". Keep the output signal as low as possible to avoid a.v.c. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

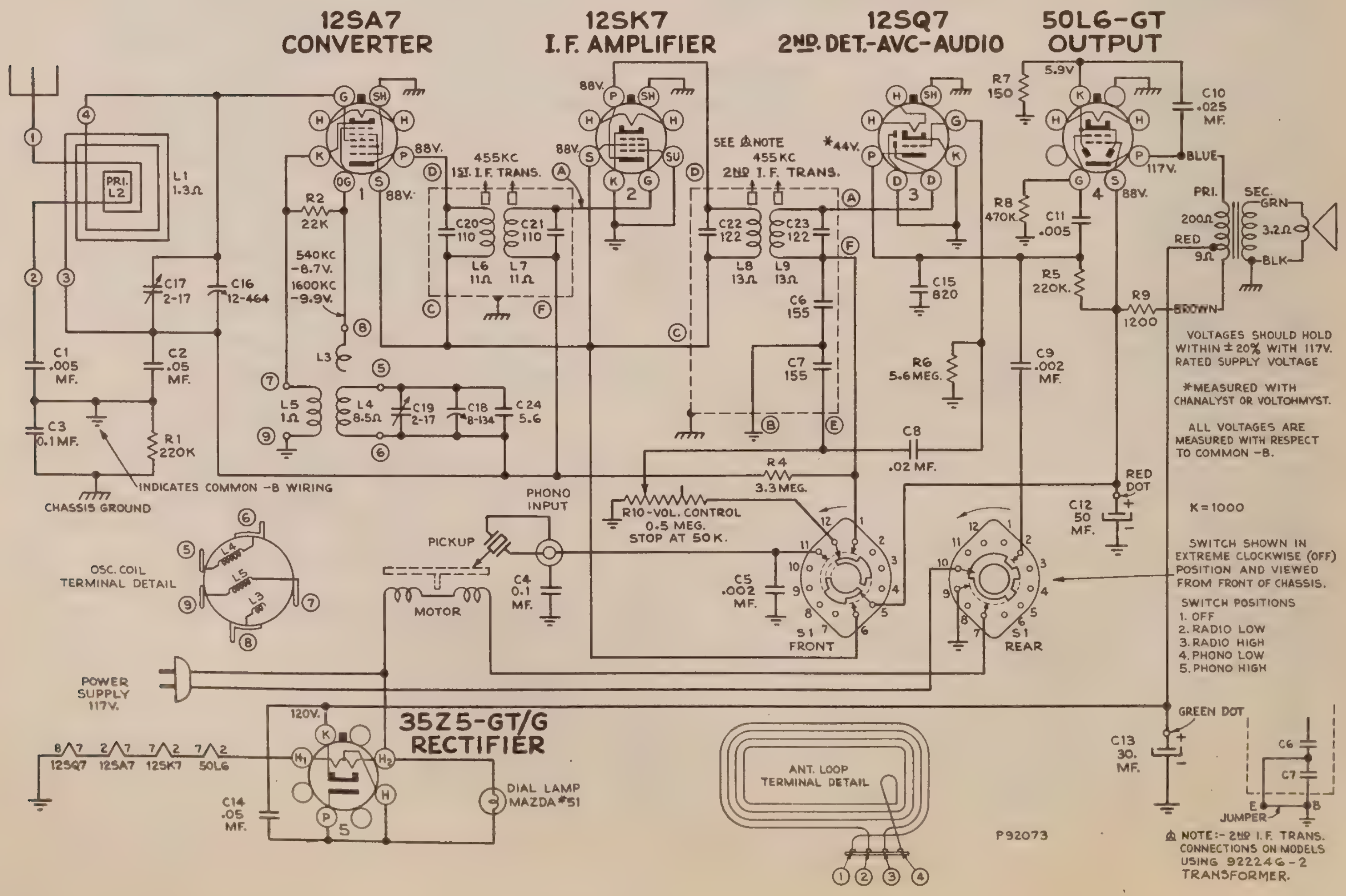
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer *
NOTE.—ANTENNA LOOP MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal Frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

*Do not readjust L8 or L9


L9 455 KC
L7 455 KC
PHONO JACK
35Z5 GT/G 5
50L6 GT 4
12SQ7 3
2ND IF TRANS
12SK7 2
1ST IF TRANS
12SA7 1
L8 455 KC
L6 455 KC
C16 R.F.
C17 1300 KC
C18 OSC.
C19 1600 KC
TVE

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d.c., as this would damage the motor.

Reversal of plug in outlet receptacle may reduce hum.


12SA7 CONVERTER
12SK7 I.F. AMPLIFIER
12SQ7 2ND DET.-AVC-AUDIO
50L6-GT OUTPUT
88V.
455KC 1ST I.F. TRANS.
SEE NOTE
455KC 2ND I.F. TRANS.
*44V.
5.9V
117V.
PRI. L2
L1 1.3Ω
R2 22K
540KC -8.7V. 1600KC -9.9V.
C20 110
C21 110
L6 11Ω
L7 11Ω
C22 122
C23 122
L8 13Ω
L9 13Ω
C6 155
C7 155
R7 150
C10 .025 MF.
BLUE
R8 470K
C11 .005
C15 820
R5 220K
R9 1200
PRI. 200Ω
SEC. GRN
3.2Ω
RED 9Ω
BLK
BROWN
R6 5.6MEG.
C9 .002 MF.
C8 .02 MF.
R4 3.3MEG.
C17 2-17
C16 12-464
C1 .005 MF.
C2 .05 MF.
C3 0.1 MF.
R1 220K
L3
L5 1Ω
L4 8.5Ω
C19 2-17
C18 8-134
C24 5.6
INDICATES COMMON -B WIRING
CHASSIS GROUND
PHONO INPUT
PICKUP
R10-VOL. CONTROL 0.5 MEG. STOP AT 50K.
C4 0.1 MF.
MOTOR
C5 .002 MF.
S1 FRONT
S1 REAR
RED DOT
C12 50 MF.
OSC. COIL TERMINAL DETAIL
POWER SUPPLY 117V.
120V.
35Z5-GT/G RECTIFIER
8/7 12SQ7
2/7 12SA7
7/2 12SK7
7/2 50L6
C14 .05 MF.
DIAL LAMP MAZDA #51
ANT. LOOP TERMINAL DETAIL
P92073
GREEN DOT
C13 30. MF.
C6
C7
E
B
JUMPER

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. RATED SUPPLY VOLTAGE

*MEASURED WITH CHANALYST OR VOLTOHMYST.

ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.

K = 1000

SWITCH SHOWN IN EXTREME CLOCKWISE (OFF) POSITION AND VIEWED FROM FRONT OF CHASSIS.

SWITCH POSITIONS
1. OFF
2. RADIO LOW
3. RADIO HIGH
4. PHONO LOW
5. PHONO HIGH

NOTE:- 2ND I.F. TRANS. CONNECTIONS ON MODELS USING 922246-2 TRANSFORMER.

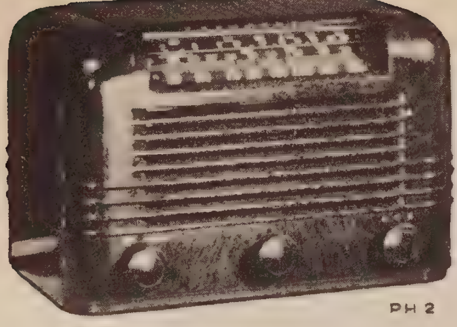
RCA MODEL QB55

Chassis No. RC-563A—Mfr. No. 274

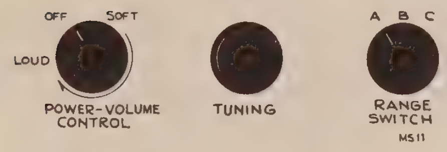
Service Data

1946 . . . . X4

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



Model QB55



Dial Controls

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (555-174m)
Medium Wave ("B" Band)	2.3-7.1 mc (130-42.2 m)
Short Wave ("C" Band)	7.1-22 mc (42.2-13.6 m)

Intermediate Frequency	455 kc

Batteries Required

1—RCA-VSO22 Battery Pack or equivalent
Or: 1—1½ Volt "A" Battery and 2—45 Volt "B" Batteries

Battery Drain

"A"	0.25 amp.
"B"	12.5 ma.

Power Output

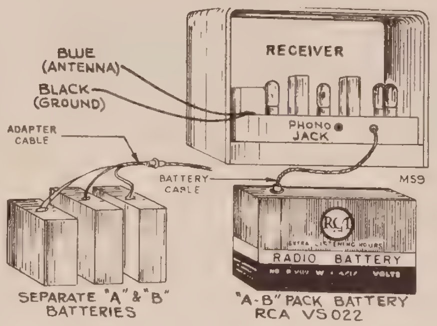
Undistorted	0.20 watt
Maximum	0.26 watt

Loudspeaker (92510-1)

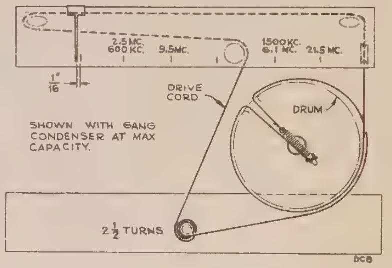
Type	5-inch permanent-magnet dynamic
Voice-coil impedance	4 ohms at 400 cycles

Cabinet Dimensions (inches)

Height	7⅝ inches
Width	12⅛ inches
Depth	6¾ inches



Power Connections



Dial Indicator and Drive Mechanism

NOTE:

Model CV-112X Electrifier (RS-111A) may be employed to operate this instrument from 117 or 234 volt 50-60 cycle power supply. For this type of operation the receiver power cable plug is inserted in the socket provided on the Electrifier.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-563A)
32548	Capacitor—Electrolytic, comprising 1 section of 12 mfd., 150 volts, and 1 section of 20 mfd., 150 volts (C20, C22)
32830	Capacitor—Mica trimmer, dual, 2-20 mmf. (C23, C24)
31292	Capacitor—Mica trimmer, dual, 3-30 mmf. (C25, C26)
39616	Capacitor—Mica, 33 mmf. (C13, C14)
39628	Capacitor—Mica, 100 mmf. (C3, C9, C10, C15, C17)
39636	Capacitor—Mica, 220 mmf. (C1)
70667	Capacitor—Mica, 560 mmf. (C4)
39660	Capacitor—Mica, 2200 mmf. (C6)
39668	Capacitor—Mica, 4700 mmf. (C7)
70600	Capacitor—Tubular, .001 mfd., 200 volts (C16)
70603	Capacitor—Tubular, .003 mfd., 200 volts (C18)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C8)
70608	Capacitor—Tubular, .007 mfd., 400 volts (C19)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C27)
70613	Capacitor—Tubular, .03 mfd., 200 volts (C12)
70617	Capacitor—Tubular 0.1 mfd., 200 volts (C11)
32821	Coil—Antenna coil, "A," "B" and "C" bands (L1, L2, L3, L4)
32148	Coil—Oscillator coil, "A" band (L5, L6)
33784	Coil—Oscillator coil, "B" band (L7, L8)
38295	Coil—Oscillator coil, "C" band (L9, L10)
38287	Condenser—Variable tuning condenser (C2, C5, C21)
36080	Control—Volume control and power switch (R6, S3, S4)
32634	Cord—Drive cord (approx. 49 inches overall length)
36093	Core—Adjustable core and stud for "A" band oscillator coil
35788	Core—Adjustable core and stud for "B" band oscillator coil
38296	Core—Adjustable core and stud for "C" band oscillator coil
12006	Core—Adjustable core and stud for I-F transformers
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
38288	Plate—Dial back plate complete with drive cord pulleys
30568	Plug—4 prong male plug for battery cable
36230	Pulley—Drive cord pulley
30652	Resistor—1 megohm, ¼ watt (R1, R7)
14752	Resistor—2.7 megohms, ¼ watt (R3)
30649	Resistor—2.2 megohms, ¼ watt (R9)
30931	Resistor—4.7 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R8, R13)
30498	Resistor—390 ohms, ¼ watt (R10)
30494	Resistor—4700 ohms, ¼ watt (R11)
30787	Resistor—47,000 ohms, ¼ watt (R12)
14138	Resistor—68,000 ohms, ½ watt (R2, R4)
36897	Shaft—Tuning knob shaft
70377	Shield—Tube shield for IN5GT tube
33742	Socket—Phono input socket
31319	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord spring
31261	Spring—Retaining spring for "A" and "C" band oscillator coil core and stud
12007	Spring—Retaining spring for "B" band oscillator coil core and stud and retaining spring for I-F transformers' core and stud assemblies
38297	Switch—Range switch (S1, S2)
35636	Transformer—First I-F transformer (L11, L12, C9, C10)
36122	Transformer—Second I-F transformer (L13, L14, C13, C14)
38300	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES (92510-1)
70413	Speaker—5-inch P.M. speaker complete
	Note: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36890	Clamp—Dial clamp, left hand
36891	Clamp—Dial clamp, right hand
35480	Decal—Range switch decal
361[illegible]	Decal—Volume control and power switch decal
38328	Dial—Glass dial scale
36886	Knob—Range switch or volume control knob
36722	Knob—Tuning knob
30900	Spring—Retaining spring for control knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

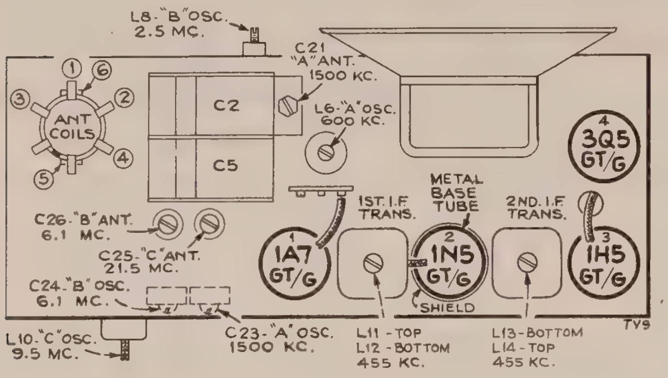
Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Calibration Scale.—The dial backing plate has 6 marks which correspond to the frequencies indicated on the "Dial Indicator and Drive Mechanism" drawing. These marks are used during alignment.

Before alignment, set the dial pointer so that, with the tuning condenser gang in full mesh, the pointer is 1/16 inch to the left of the left hand mark on the dial backing plate.


L8-"B"OSC. 2.5 MC.
C21 "A" ANT. 1500 KC.
L6-"A"OSC. 600 KC.
ANT COILS
C2
C5
3Q5 GT/G
METAL BASE TUBE
1ST. I.F TRANS.
2ND. I.F TRANS.
C26-"B"ANT. 6.1 MC.
C25-"C"ANT. 21.5 MC.
C24-"B" OSC. 6.1 MC.
1A7 GT/G
1N5 GT/G
1H5 GT/G
SHIELD
L10-"C"OSC. 9.5 MC.
C23-"A" OSC. 1500 KC.
L11 - TOP
L12 - BOTTOM
455 KC.
L13 - BOTTOM
L14 - TOP
455 KC.
TV9

PRECAUTIONARY LEAD DRESS

1. The 220 mmf. condenser (C1) from the gang to the wiring panel on top of chassis to be dressed away from the chassis.
2. All oscillator plate leads to coils and switch to be as short and direct as possible.
3. The green lead from r-f section of the tuning condenser gang to terminal No. 3 on switch S1 to be dressed as near as possible to terminal No. 10 on switch S2 and to the green lead from oscillator section of the tuning condenser gang.
4. The black lead from terminal No. 9 on switch S2 to L10 to be dressed below and touching the black lead from terminal No. 2 on switch S1 to the C-band antenna trimmer (C25).
5. The red lead from the B-band oscillator trimmer (C24) to the B-band oscillator coil (L8) to be dressed above and touching the yellow lead from terminal No. 1 on switch S1 to the B-band antenna trimmer (C26).
6. The 100 mmf. mica capacitor (C3) from oscillator section of the condenser gang to terminal 5 of IA7GT/G socket dressed away from the chassis.

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. peak output—
1	IN5GT/G IF grid cap in series with .01 mfd.	455 kc	"A" Band Quiet Point at High Freq. End	L14 and L13 (2nd I-F Trans.)
2	IA7GT/G 1st det. grid cap in series with .01 mfd.			L12 and L11† (1st I-F Trans.)
3	Antenna Lead in series with 200 mmf.	1,500 kc	1,500 kc mark	Peak C23 (osc.) and C21 (ant.)
4		600 kc	600 kc mark	L6 (osc.)**
5		Repeat steps 3 and 4.		
6	Antenna Lead in series with 300 ohms	6.1 mc	6.1 mc mark	Peak C24 (osc.)* and C26 (ant.)
7		2.5 mc	2.5 mc mark	L8 (osc.)**
8		Repeat steps 6 and 7.		
9		9.5 mc	9.5 mc mark	L10 (osc.)**
10		21.5 mc	21.5 mc mark	C25 (ant.)**

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly for peak output.

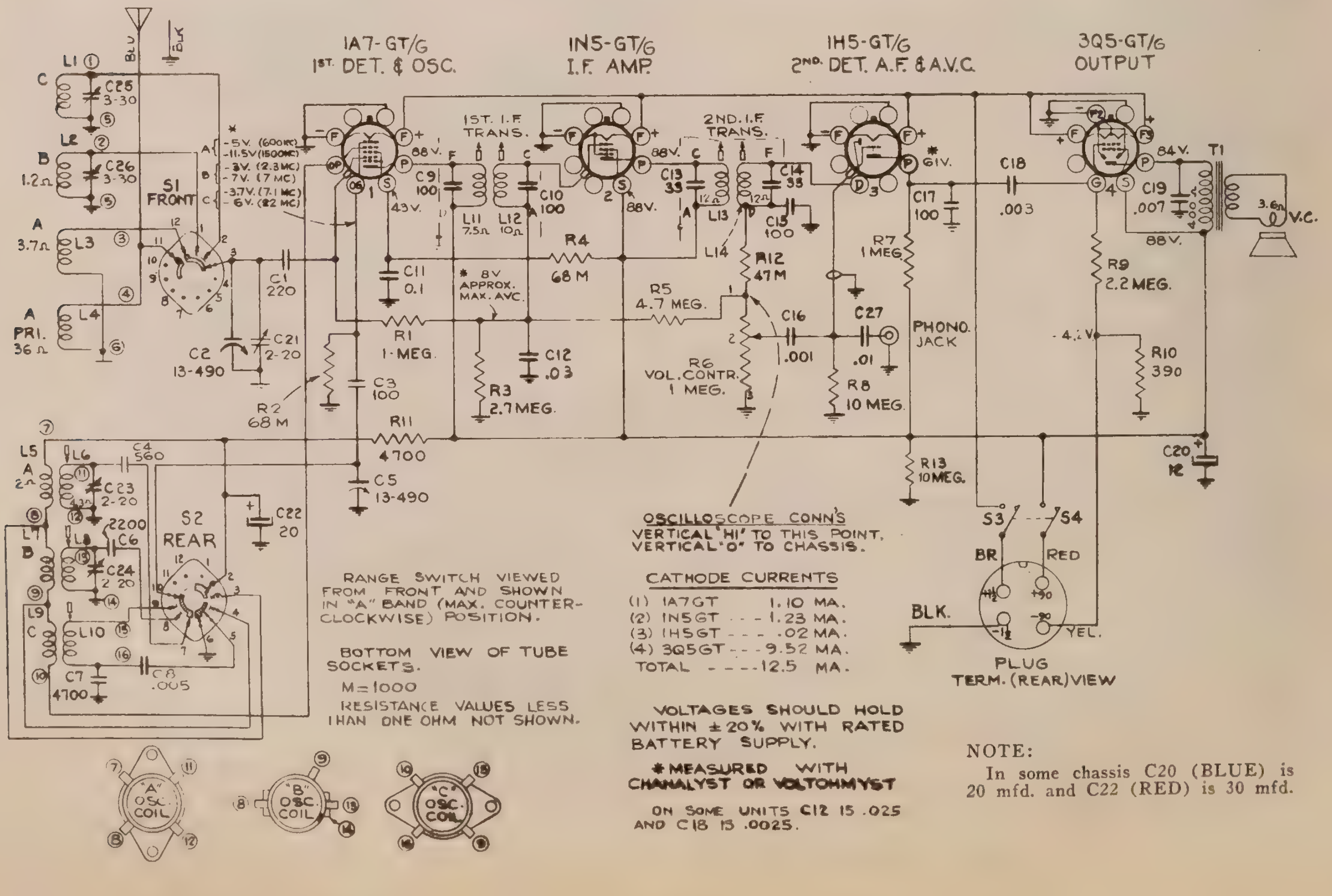
† Do not readjust L14 or L13 when test oscillator is applied to IA7-GT/G grid.

VICTROLA ATTACHMENT

A jack is provided on the rear of chassis for connecting a Victrola Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Victrola is not in use its plug should be disconnected.

When Victrola is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.


1A7-GT/G 1ST. DET. & OSC.
1N5-GT/G I.F. AMP.
1H5-GT/G 2ND. DET. A.F. & A.V.C.
3Q5-GT/G OUTPUT
BLU
BLK
L1
C
C25 3-30
L2
B 1.2Ω
C26 3-30
S1 FRONT
A 3.7Ω
L3
A PRI. 36Ω
L4
C2 13-490
C21 2-20
C1 220
-5V. (600KC)
-11.5V (1500KC)
-3V. (2.3MC)
-7V. (7MC)
-3.7V. (7.1MC)
-6V. (22MC)
88V.
43V.
C9 100
1ST. I.F. TRANS.
L11 7.5Ω
L12 10Ω
C10 100
C11 0.1
* 8V APPROX. MAX. AVC.
R4 68 M
R1 1-MEG.
R3 2.7MEG.
C12 .03
C3 100
R2 68 M
R11 4700
C5 13-490
2ND. I.F. TRANS.
88V.
C13 33
L13
L14
C14 33
C15 100
R12 47M
R5 4.7 MEG.
C16 .001
R6 VOL. CONTR. 1 MEG.
* 61V.
C17 100
R7 1 MEG.
C27 .01
R8 10 MEG.
PHONO. JACK
C18 .003
C19 .007
84V.
T1
3.6Ω V.C.
88V.
R9 2.2 MEG.
-4.1V.
R10 390
C20 12
R13 10MEG.
S3
S4
BR
RED
BLK.
YEL.
PLUG TERM. (REAR) VIEW
L5 A 2Ω
L6
C4 560
C23 2-20
L7 B
L8
C6 2200
C24 2-20
S2 REAR
C22 20
L9 C
L10
C7 4700
C8 .005
OSCILLOSCOPE CONN'S
VERTICAL "HI" TO THIS POINT.
VERTICAL "O" TO CHASSIS.
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER-CLOCKWISE) POSITION.
BOTTOM VIEW OF TUBE SOCKETS.
M=1000
RESISTANCE VALUES LESS THAN ONE OHM NOT SHOWN.
CATHODE CURRENTS
(1) 1A7GT 1.10 MA.
(2) 1N5GT 1.23 MA.
(3) 1H5GT .02 MA.
(4) 3Q5GT 9.52 MA.
TOTAL 12.5 MA.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST
ON SOME UNITS C12 IS .025 AND C18 IS .0025.
"A" OSC. COIL
"B" OSC. COIL
"C" OSC. COIL

NOTE:
In some chassis C20 (BLUE) is 20 mfd. and C22 (RED) is 30 mfd.

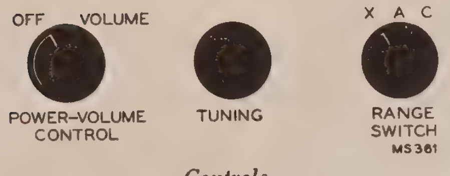
RCA Model QB55X

Chassis No. RC-563K—Mfr. No. 274

Service Data

1947....X2

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



Controls

Specifications

Frequency Ranges

Long Wave ("X" Band)	145-385 kc (2069-779m)
Standard Broadcast ("A" Band)	540-1,720 kc (555-174m)
Short Wave ("C" Band)	5.8-18mc (51.7-16.6m)

Intermediate Frequency	455 kc

Batteries Required

1—RCA-VSO22 Battery Pack or equivalent
Or: 1—1½ Volt "A" Battery and 2—45 Volt "B" Batteries

A four wire cable with plug is provided for making connection to the RCA-VSO22 battery pack or equivalent. When separate batteries are used, an adapter extension cable is necessary.

Battery Drain

"A"	0.25 amp.
"B"	12.5 ma.

Power Output

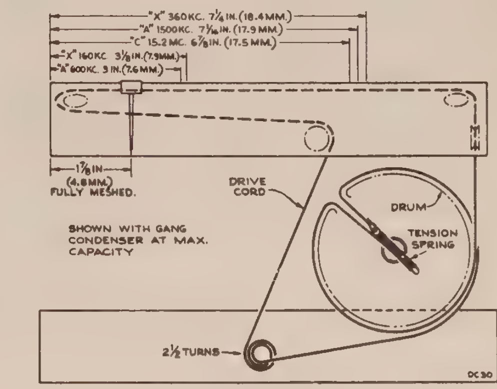
Undistorted	0.20 watt
Maximum	0.26 watt

Loudspeaker (92510-1)

Type	5-inch permanent-magnet dynamic
Voice-coil impedance	4 ohms at 400 cycles

Cabinet Dimensions (inches)

Height	7⅝ inches
Width	12⅛ inches
Depth	6¾ inches


"X" 360KC. 7¼ IN. (18.4MM.)
"A" 1500KC. 7$\frac{1}{16}$ IN. (17.9MM.)
"C" 15.2MC. 6⅞ IN. (17.5MM.)
"X" 160KC. 3⅛ IN. (7.9MM.)
"A" 600KC. 3 IN. (7.6MM.)
1⅞ IN. (4.8MM.) FULLY MESHED.
DRIVE CORD
DRUM
TENSION SPRING
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY
2½ TURNS
DC30

Dial Cord Assembly and Alignment Check Points

NOTE:

Model CV-112X Electrifier (RS-111A) may be employed to operate this instrument from 117 or 234 volt 50-60 cycle power supply. For this type of operation the receiver power cable plug is inserted in the socket provided on the Electrifier. Refer to Supplementary Information for complete information on CV-112X Electrifier.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-563K
32830	Capacitor—Mica trimmer, dual 2-20 mmf. (C25, C26)
33788	Capacitor—Mica trimmer, comprising two sections of 5-60 mmf. and 1 section of 2-20 mmf. (C23, C24, C29)
39622	Capacitor—Mica, 56 mmf. (C28)
72810	Capacitor—Mica, 100 mmf. (C3, C15, C17)
39636	Capacitor—Mica, 220 mmf. (C1)
71014	Capacitor—Mica, 220 mmf. (C4)
72841	Capacitor—Mica, 560 mmf. (C6)
72637	Capacitor—Mica, 3900 mmf. (C7)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C16)
70603	Capacitor—Tubular, .003 mfd., 400 volts (C18)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C8)
70608	Capacitor—Tubular, .007 mfd., 400 volts (C19)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C27)
70613	Capacitor—Tubular, .03 mfd., 400 volts (C12)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11)
32548	Capacitor—Electrolytic, comprising 1 section of 12 mfd., 150 volts and 1 section of 20 mfd., 150 volts (C20, C22)
32706	Coil—Antenna coil, "A" and "C" band (L1, L2, L3, L4)
32823	Coil—Antenna coil, "X" band (L5, L6)
33786	Coil—Oscillator coil, "X" band (L7, L8)
32148	Coil—Oscillator coil, "A" band (L9, L10)
33787	Coil—Oscillator coil, "C" band (L15, L16)
38287	Condenser—Variable tuning condenser (C2, C5, C21)
38406	Control—Volume control and power switch (R6, S3, S4)
32634	Cord—Drive cord (approx. 49" overall length)
	NOTE: Before assembling, stretch to full length.
36237	Drum—Drive drum
70429	Grommet—Rubber grommet for mounting tube socket
16058	Grommet—Rubber grommet for mounting tuning condenser (4 required)
37068	Indicator—Station selector indicator
72656	Plate—Dial back plate complete with four (4) pulleys less dial
30568	Plug—4 prong male plug for battery cable
36230	Pulley—Drive cord pulley
30498	Resistor—390 ohms, ¼ watt (R10)
30494	Resistor—4700 ohms, ¼ watt (R11)
30787	Resistor—47,000 ohms, ¼ watt (R12)
14138	Resistor—68,000 ohms, ½ watt (R4)
11959	Resistor—180,000 ohms, ½ watt (R2)
30652	Resistor—1 megohm, ¼ watt (R1, R7)
30649	Resistor—2.2 megohms, ¼ watt (R9)
72788	Resistor—2.7 megohms, ¼ watt (R3)
30931	Resistor—4.7 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R8, R13)
36897	Shaft—Tuning knob shaft
70377	Shield—Shield for IN5GT tube
33742	Socket—Phono input socket
31251	Socket—Tube socket, wafer
31319	Socket—Tube socket, cushion mounted
31418	Spring—Drive cord tension spring
72657	Switch—Range switch (S1, S2)
35636	Transformer—First I.F. transformer (L11, L12, C9, C10)
36122	Transformer—Second I.F. transformer (L13, L14, C13, C14)
38300	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92510-1
70413	Speaker—5" P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
Y947	Cabinet—Brown plastic cabinet
36890	Clamp—Dial clamp, left hand
36891	Clamp—Dial clamp, right hand
36103	Decal—Power switch decal
72659	Decal—Range switch decal
72658	Dial—Glass dial scale
36886	Knob—Range switch or volume control knob
36722	Knob—Tuning knob
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

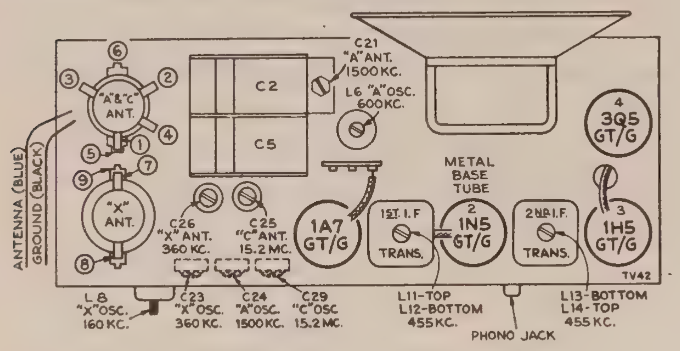
Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Calibration Scale:

Alignment calibration check points are indicated on the "Dial Cord Assembly and Alignment Check Points" drawing.

Before alignment, with the tuning condenser at maximum capacity (fully meshed) set the dial pointer 1⅞ in (4.8mm) from the left hand edge of the dial back plate as indicated on the drawing.


C21
"A" ANT.
1500 KC.
L6 "A" OSC.
600 KC.
C2
C5
"A" & "C" ANT.
"X" ANT.
ANTENNA (BLUE)
GROUND (BLACK)
C26
"X" ANT.
360 KC.
C25
"C" ANT.
15.2 MC.
1A7 GT/G
1ST. I.F TRANS.
METAL BASE TUBE
2 1N5 GT/G
2ND I.F. TRANS.
3 1H5 GT/G
4 3Q5 GT/G
TV42
L8 "X" OSC. 160 KC.
C23 "X" OSC. 360 KC.
C24 "A" OSC. 1500 KC.
C29 "C" OSC 15.2 MC.
L11-TOP L12-BOTTOM 455 KC.
PHONO JACK
L13-BOTTOM L14-TOP 455 KC.

Critical Lead Dress:

1. All leads from the antenna coils (on top of chassis) to range switch should be dressed away from the coil windings.
2. The black lead from L1—terminal #1 to S1-#4 should be dressed around rear of range switch away from chassis base.
3. Condenser C1 on top of chassis should be dressed away from chassis base.
4. The green leads connecting the gang to the range switch should be dressed away from all other leads and away from chassis base.
5. The oscillator grid coupling condenser (C3) should be dressed perpendicular to the chassis base.
6. Dress all parts and leads away from terminal "D" of the 2nd. IF transformer.
7. All B+ (red) leads should be dressed close to chassis base.

Steps	Connect high side of test osc. to.—	Tune test osc. to.—	Turn Radio dial to.—	Adjust following for max. peak output.—
1	1N5GT I.F. grid cap in series with .01 mfd.	455 kc.	"A" Band Quiet point at low freq. end.	L14 and L13 2nd I.F. trans.
2	1A7GT 1st det. grid cap in series with .01 mfd.†			L12 and L11 1st I.F. trans.†
3	Ant. lead in series with 200 mmfd.	1500 kc.	1500 kc. mark	Preset L10 (osc.) screw ⅜ in. out C24 osc. C21 ant.
4		600 kc.	600 kc. mark	L10**
5		Repeat Steps 3 and 4		
6		360 kc.	360 kc. mark	Preset L8 (osc.) screw ⅝ in. out. C23 osc. C26 ant.
7		160 kc.	160 kc. mark	L8**
8		Repeat Steps 6 and 7		
9	Ant. lead in series with 300 ohms.	15.2 mc.	15.2 mc. mark	C29 osc.* C25 ant.**

*Use minimum capacity peak if two peaks can be obtained.

**Rock gang slightly for peak output.

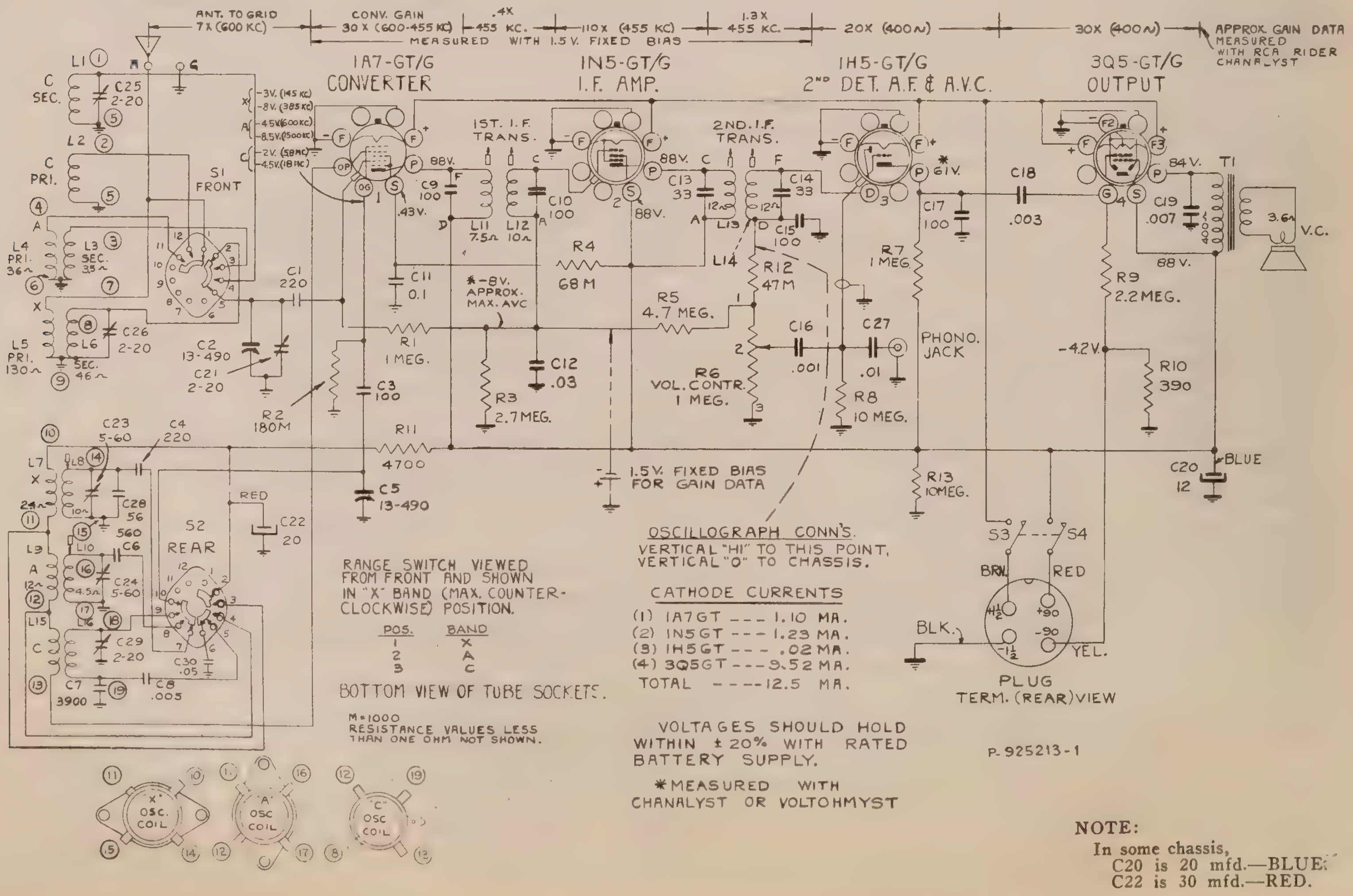
†Do not readjust L14 or L13 when test oscillator is applied to 1A7-GT/G grid.

Phonograph Attachment

A jack is provided on the rear of chassis for connecting a Phonograph Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Phonograph is not in use its plug should be disconnected.

When Phonograph is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.


ANT. TO GRID 7X (600 KC)
CONV. GAIN 30 X (600-455 KC)
.4X 455 KC.
110X (455 KC)
1.3X 455 KC.
20X (400~)
30X (400~)
MEASURED WITH 1.5 V. FIXED BIAS
APPROX. GAIN DATA MEASURED WITH RCA RIDER CHANALYST
1A7-GT/G CONVERTER
1N5-GT/G I.F. AMP.
1H5-GT/G 2ND DET. A.F. & A.V.C.
3Q5-GT/G OUTPUT
L1 ①
A
G
C SEC.
C25 2-20
L2 ②
C PRI.
L4 PRI. 36~
L3 SEC. 35~
L5 PRI. 130~
L6 SEC. 46~
C26 2-20
S1 FRONT
X -3V. (145 KC) -8V. (385 KC)
A -4.5V (600 KC) -8.5V (1500 KC)
C -2V. (58 MC) -4.5V (18 MC)
C1 220
C2 13-490
C21 2-20
R2 180M
C3 100
R1 1 MEG.
R11 4700
C5 13-490
88V.
.43V.
C9 100
1ST. I.F. TRANS.
L11 7.5~
L12 10~
C10 100
C11 0.1
*-8V. APPROX. MAX. AVC
R3 2.7 MEG.
C12 .03
R4 68M
88V.
C13 33
2ND. I.F. TRANS.
12~
L13
L14
C14 33
C15 100
R5 4.7 MEG.
R12 47M
R6 VOL. CONTR. 1 MEG.
C16 .001
C27 .01
R8 10 MEG.
PHONO. JACK
*61V.
C17 100
R7 1 MEG.
R13 10MEG.
C18 .003
C19 .007
84V.
T1
400~
3.6~
V.C.
88 V.
R9 2.2 MEG.
-4.2V.
R10 390
C20 12
BLUE
1.5V. FIXED BIAS FOR GAIN DATA
C23 5-60
C4 220
L7 X 24~
L8
C28 56
560
L9 A 12~
L10
C6
C24 5-60
4.5~
L15 C
L16
C29 2-20
C30 .05
C7 3900
C8 .005
S2 REAR
RED
C22 20
S3
S4
BRN.
RED
BLK.
YEL.
+1½
+90
-1½
-90
PLUG TERM. (REAR) VIEW
"X" OSC. COIL
"A" OSC COIL
"C" OSC COIL
P-925213-1

OSCILLOGRAPH CONN'S.
VERTICAL "HI" TO THIS POINT,
VERTICAL "O" TO CHASSIS.

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "X" BAND (MAX. COUNTER-CLOCKWISE) POSITION.

POS.	BAND
1	X
2	A
3	C

BOTTOM VIEW OF TUBE SOCKETS.

M=1000
RESISTANCE VALUES LESS THAN ONE OHM NOT SHOWN.

CATHODE CURRENTS

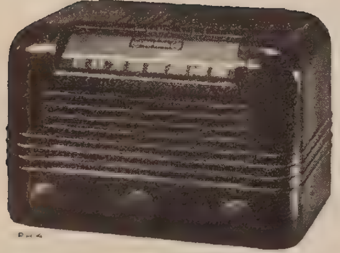
(1)	1A7GT	1.10 MA.
(2)	1N5GT	1.23 MA.
(3)	1H5GT	.02 MA.
(4)	3Q5GT	9.52 MA.
	TOTAL	12.5 MA.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST

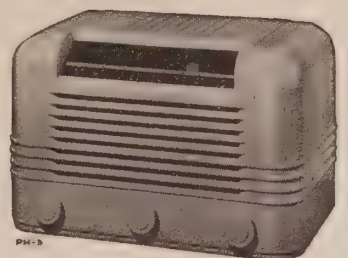
NOTE:
In some chassis,
C20 is 20 mfd.—BLUE.
C22 is 30 mfd.—RED.

56X3



56X2 →

56X ←



RCA VICTOR

56X, 56X2, 56X3

Chassis No. RC-1011—1st Prod.
RC-1011A—2nd Prod.
RC-1011B—3rd Prod.
Mfr. No. 274

Service Data

1945 . . No. . 1

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range	540-1600 kc
Intermediate Frequency	455 kc

Power Output

Undistorted	1.0 watt
Maximum	1.5 watts

Tube Complement

(1)	RCA-12SG7	Converter
(2)	RCA-12SK7	I.F. Amplifier
(3)	RCA-12SQ7	2nd Det., A.V.C., and A.F. Amplifier
(4)	RCA-35L6GT	Power Output
(5)	RCA-12J5GT (RC-1011) RCA-12SR7 (RC-1011A) RCA-12SH7 (RC-1011B)	Oscillator
(6)	RCA-35Z5GT	Rectifier

Loudspeaker (92510-1)

Type	5-inch PM
V. C. Impedance	3.4 ohms at 400 cycles

Cabinet Dimensions	**Height**	**Width**	**Depth**
56X (Brown Plastic)	8 in.	12¼ in.	7½ in.
56X2 (Ivory Plastic)	8 in.	12¼ in.	7½ in.
56X3 (Wood)	8¾ in.	14½ in.	8¼ in.

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC	30 watts
Pilot Lamp	Mazda No. 51, 6-8 volts, 0.2 amp.
Tuning Drive Ratio	20:1

Critical Lead Dress

1. Dress output plate bypass capacitor (C-11, .02 mf.) against chassis.
2. Dress 35L6GT plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7, 02 mf.) away from 35L6GT heater leads.
4. Dress tone control lead against front apron.
5. Dress 2nd I-F yellow and brown leads away from output plate bypass capacitor (C-11, .02 mf.) and away from all heater leads.
6. Dress lead to speaker voice coil away from tuning shaft "C" washer.
7. Dress tone control capacitor (C-10, .0018 mf.) away from oscillator coil.
8. Dress all uninsulated leads away from each other and away from chassis to prevent short circuits.
9. Dress blue and green leads of both IF transformers back in shields leaving exposed lengths as short as possible.

Replacement Parts

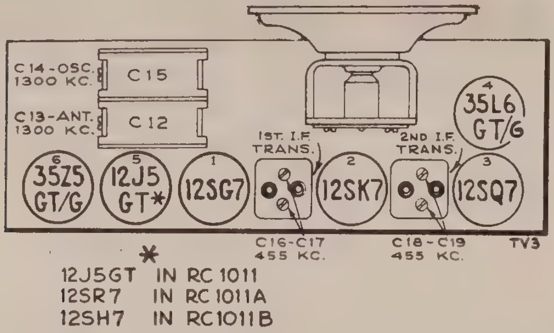
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-1011, RC-1011A, RC-1011B
39640	Capacitor—Mica, 330 mmf. (C-8)
70712	Capacitor—Tubular, .0018 mfd., 800 volts (C-10)
70627	Capacitor—Tubular, .005 mfd., 1200 volts (C-9)
70652	Capacitor—Tubular, .01 mfd., 1000 volts (C-1, C-3, C-4)
70711	Capacitor—Tubular, .02 mfd., 700 volts (C-7, C-11)
70635	Capacitor—Tubular, .035 mfd., 600 volts (C-2)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C-23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C-22)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C-20, C-21)
39824	Coil—Oscillator coil (L-7, L-8, L-9)
36226	Condenser—Variable tuning condenser (C-12, C-13, C-14, C-15)
36242	Control—Volume control and power switch (R-12, S-1)
32634	Cord—Drive cord (approx. 49" long)
70392	Cord—Power cord
36237	Drum—Drive drum
36236	Indicator—Station selector indicator for 56X and 56X2
37068	Indicator—Station selector indicator for 56X3
39821	Loop—Antenna loop (L-1)
11765	Lamp—Dial lamp
36229	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R-6)
6134	Resistor—1200 ohms, 1 watt (R-11)
30654	Resistor—1500 ohms, ¼ watt (R-4)
30733	Resistor—3300 ohms, ¼ watt (R-1)
30492	Resistor—22,000 ohms, ¼ watt (R-2)
14583	Resistor—220,000 ohms, ¼ watt (R-8, R-10)
30648	Resistor—470,00 ohms, ¼ watt (R-7)
38785	Resistor—15 megohms, ¼ watt (R-3)
12928	Resistor—3.3 megohms, ¼ watt (R-5)
30931	Resistor—4.7 megohms, ¼ watt (R-9)
36897	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded (RC-1011 and RC-1011A)
32299	Socket—Tube socket, wafer (RC-1011B)
31418	Spring—Drive cord tension spring
36228	Switch—Tone switch (S-2)
70411	Transformer—First I.F. transformer (L-3, L-4, C-16, C-17)
70412	Transformer—Second I.F. transformer (L-5, L-6, C-5, C-6, C-18, C-19)
36800	Transformer—Output transformer (T-1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	92510-1
70413	Speaker—5-inch PM speaker, complete
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back for 56X
70409	Back—Cabinet back for 56X2
70415	Back—Cabinet back for 56X3
X1604	Board—Baffle board and grille cloth
36890	Clamp—Dial clamp, left hand, for 56X and 56X2
36891	Clamp—Dial clamp, right hand, for 56X and 56X2
39954	Dial—Glass dial scale for 56X and 56X2
70410	Dial—Glass dial scale for 56X3
37831	Fastener—Push fastener (1 set) for cabinet backs on 56X and 56X2
33006	Feet—Rubber feet for cabinet (4 required)
70414	Knob—Control knob (ivory) for 56X2
36722	Knob—Control knob (walnut) for 56X and 56X3
30900	Spring—Retaining spring for knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

56X—56X2—56X3 Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf. capacitor to common "-B." Keep the output signal as low as possible to avoid AVC action.

Output Meter.—Connect leads between speaker voice coil and chassis. Turn volume control to maximum clockwise, tone control to maximum highs (clockwise).


C14-OSC. 1300 KC.
C15
C13-ANT. 1300 KC.
C12
1ST. I.F. TRANS.
2ND I.F. TRANS.
35L6 GT/G
35Z5 GT/G
12J5 GT*
12SG7
12SK7
12SQ7
C16-C17 455 KC.
C18-C19 455 KC.
TV3
*
12J5GT IN RC 1011
12SR7 IN RC 1011A
12SH7 IN RC1011B

Dial Pointer Adjustment.—Rotate tuning condenser fully counterclockwise (plates closed). Adjust indicator pointer to left (max. Cap.) mark on dial back plate.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	C18 and C19 2nd I-F trans.
2				C16 and C17 1st I-F trans.
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C14 (osc.) C13 (ant.)
4	Repeat step 3.			

Output Transformer Color Coding

Color coding of the primary leads of the output transformers on some sets may differ from published Service Data.

Service Data		May Be
Blue	to filter resistor	Brown
Black	to rectifier cathode	Red
Red	to output plate	Blue

220,000 Ohm Resistor

Some sets have a 220,000 ohm resistor in shunt with the primary of the 1st I-F transformer. Replacement transformers may not need this resistor, if the I-F Amplifier seems stable.

22 Ohm Series Fuse Resistor

Some sets have a 22 ohm, 1 watt resistor, as a fuse in series with the electrolytic capacitor.

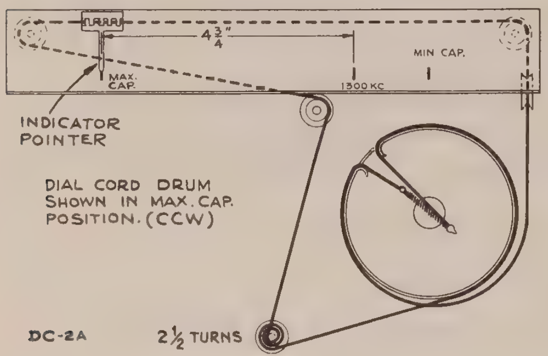
Capacitor on Oscillator Coil

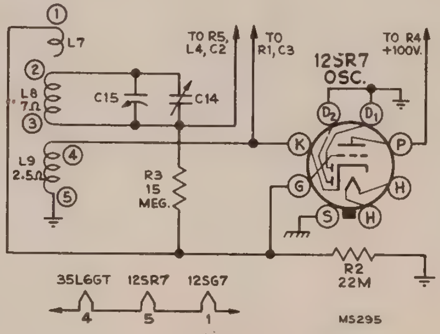
Some sets have a 56 mmf. capacitor from terminal #1 to #2. This is not necessary on replacement coils as they have a built-in capacity winding.

Volume Control

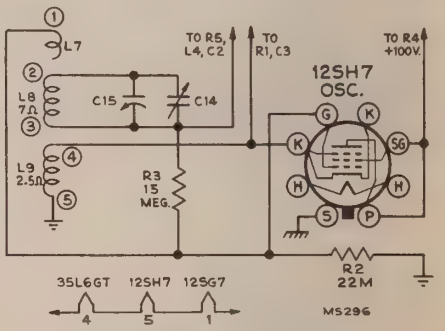
On some models the 500,000 ohm volume control is not furnished with a stop 50,000 ohms from the high end of the control. Volume controls having no stop can be identified by a dot of red lacquer on the left side of the control, viewing the shaft end with terminals up. In models using this control, a 56,000 ohm ½ watt resistor, completely covered with spaghetti tubing, is connected between the high end of the control and the yellow lead on the second i-f transformer.

Replacement controls equipped with a stop do not need this external 56,000 ohm resistor, so when replacing a volume control, check the resistance between the arm and the high end of the replacement control with the arm turned fully clockwise. A reading of 50,000 ohms will indicate that the control is equipped with a stop, and that the 56,000 ohm resistor in the set should be removed before installing the new control.

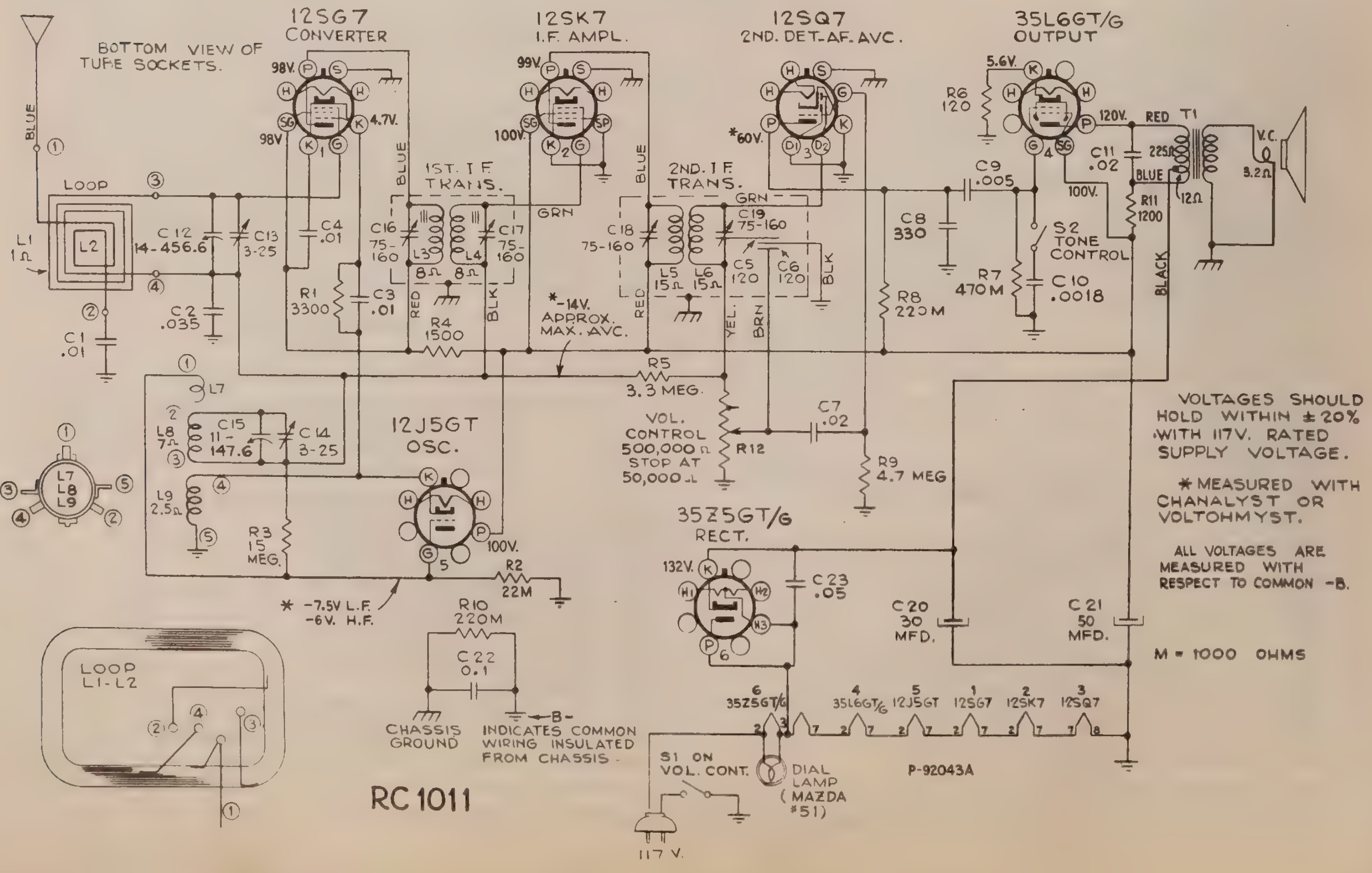

4¾"
MIN CAP.
MAX. CAP.
1300 KC
INDICATOR POINTER
DIAL CORD DRUM SHOWN IN MAX. CAP. POSITION. (CCW)
DC-2A
2½ TURNS


L7
L8 7Ω
L9 2.5Ω
C15
C14
R3 15 MEG.
TO R5, L4, C2
TO R1, C3
TO R4 +100V.
12SR7 OSC.
R2 22M
35L6GT 12SR7 12SG7
MS295

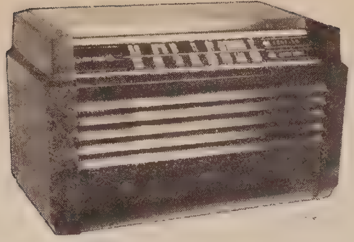
RC 1011A
OTHERWISE IDENTICAL TO RC1011


L7
L8 7Ω
L9 2.5Ω
C15
C14
R3 15 MEG.
TO R5, L4, C2
TO R1, C3
TO R4 +100V.
12SH7 OSC.
R2 22M
35L6GT 12SH7 12SG7
MS296

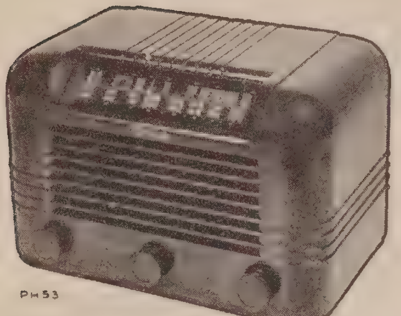
RC 1011B
OTHERWISE IDENTICAL TO RC1011


BOTTOM VIEW OF TUBE SOCKETS.
12SG7 CONVERTER
12SK7 I.F. AMPL.
12SQ7 2ND. DET.-AF.-AVC.
35L6GT/G OUTPUT
BLUE
LOOP
L1 1Ω
L2
C12 14-456.6
C13 3-25
C4 .01
C2 .035
C1 .01
R1 3300
C3 .01
1ST. I.F. TRANS.
C16 75-160
C17 75-160
L3 8Ω
L4 8Ω
R4 1500
*-14V. APPROX. MAX. AVC.
2ND. I.F. TRANS.
C18 75-160
C19 75-160
L5 15Ω
L6 15Ω
C5 120
C6 120
98V.
4.7V.
99V.
100V.
*60V.
5.6V.
120V.
100V.
R6 120
C9 .005
C8 330
R8 220M
R7 470M
S2 TONE CONTROL
C10 .0018
C11 .02
225Ω
R11 1200
T1
V.C. 3.2Ω
12Ω
RED
BLUE
BLACK
GRN
YEL.
BRN
BLK
R5 3.3 MEG.
VOL. CONTROL 500,000Ω STOP AT 50,000Ω
R12
C7 .02
R9 4.7 MEG
L7
L8 7Ω
L9 2.5Ω
C15 11-147.6
C14 3-25
12J5GT OSC.
R3 15 MEG.
R2 22M
* -7.5V L.F. -6V. H.F.
R10 220M
C22 0.1
CHASSIS GROUND
-B- INDICATES COMMON WIRING INSULATED FROM CHASSIS.
LOOP L1-L2
35Z5GT/G RECT.
132V.
C23 .05
C20 30 MFD.
C21 50 MFD.
35Z5GT/G 35L6GT/G 12J5GT 12SG7 12SK7 12SQ7
S1 ON VOL. CONT.
DIAL LAMP (MAZDA #51)
117 V.
P-92043A
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. RATED SUPPLY VOLTAGE.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.
M = 1000 OHMS

RC 1011



56X5 (Wood)



Model 56X10 (Plastic)

RCA VICTOR

56X5 AND 56X10

(RC-1023) (RC-1023B)

Mfr. No. 274

SERVICE DATA

1945...No. 2-13

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range

Broadcast	540-1600 kc
Short Wave	8.9-12 mc
Intermediate Frequency	455 kc

Tube-Complement

(1) RCA-12SG7	R-F Amplifier
(2) RCA-12SA7	1st Det.—Osc.
(3) RCA-12SK7	I-F Amplifier
(4) RCA-12SQ7	2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT	Power Output
(6) RCA-35Z5-GT	Rectifier

Pilot Lamp.........................Mazda No. 51, 6-8 volts, 0.2 amp.

Power Output

Undistorted	1.0 watts
Maximum	1.5 watts

Loudspeaker 92510-1

Size	5-inch PM
V.C. Impedance	3.4 ohms at 400 cycles

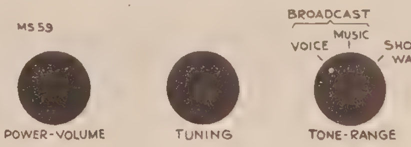
Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC	30 watts
Tuning Drive Ratio	20:1

Dimensions	**Width**	**Height**	**Depth**
56X5 (Wood)	14¾ in.	8¾ in.	8⅛ in.
56X10 (Plastic)	12 in.	8½ in.	7½ in.
Shipping Weight (approximate)			13½ lbs.

Volume Control

On some sets the 500,000 ohm volume control is not furnished with a stop 50,000 ohms from the high end of the control. Volume controls having no stop can be identified by a dot of red lacquer on the left side of the control, viewing the shaft end with terminals up. In models using this control, a 56,000 ohm ½ watt resistor, completely covered with spaghetti tubing, is connected between the high end of the control and the yellow lead on the second i-f transformer.



Replacement Parts

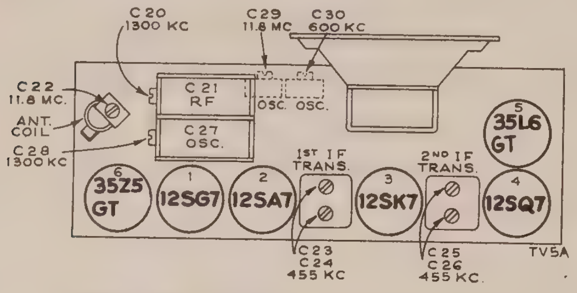
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1023B
39612	Capacitor—Mica, 22 mmf. (C15)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3, C32)
70417	Capacitor—Mica trimmer, 140-250 mmf., mounted on antenna coil (C22)
39839	Capacitor—Adjustable mica, comprising 1 section of 190-260 mmf. and 1 section of 450-600 mmf. (C29, C30)
39640	Capacitor—Mica, 330 mmf. (C9)
70712	Capacitor—Tubular, .0018 mfd. 800 volts (C8)
70627	Capacitor—Tubular, .005 mfd. 600 volts, (C10, C12)
70652	Capacitor—Tubular, .01 mfd. 1000 volts (C1, C13)
70711	Capacitor—Tubular, .02 mfd. 700 volts (C7, C11)
70635	Capacitor—Tubular, .035 mfd. 600 volts (C14)
70615	Capacitor—Tubular, .05 mfd. 400 volts (C16)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C19)
70618	Capacitor—Tubular, 0.25 mfd. 400 volts (C31)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C17, C18)
70416	Coil—Antenna coil (L3, L4, C22)
39892	Coil—Oscillator coil (L6, L7, L8, L9)
70418	Coil—Peaking coil (L5)
70700	Condenser—Variable tuning condenser (C20, C21, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
32634	Cord—Drive cord (approx. 49 inches overall length)
70392	Cord—Power cord
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp (Mazda 51)
70980	Lead—Antenna lead
39841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
30731	Resistor—1200 ohms ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9, R12)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30931	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord tension spring
39837	Switch—Range switch (S2, S3)
36800	Transformer—Output transformer (T1)
70411	Transformer—First I-F transformer (L10, L11, C23, C24)
70412	Transformer—Second I-F transformer (L12, L13, C5, C6, C25, C26)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 92510-1
70413	Speaker—5-inch P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36886	Knob—Range switch knob
36722	Knob—Volume control or tuning knob
30900	Spring—Retaining spring for knob
	RC1023 (56X5) Wood
70415	Back—Cabinet back
70419	Dial—Glass dial scale
33006	Feet—Rubber feet for cabinet (4 required)
X1337	Grille—Cabinet grille cloth
	RC1023B (56X10) Plastic
39953	Back—Cabinet back
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
71323	Decal—Trade mark decal
71310	Dial—Glass dial scale
37831	Fastener—Push fastener for cabinet back (1 set)

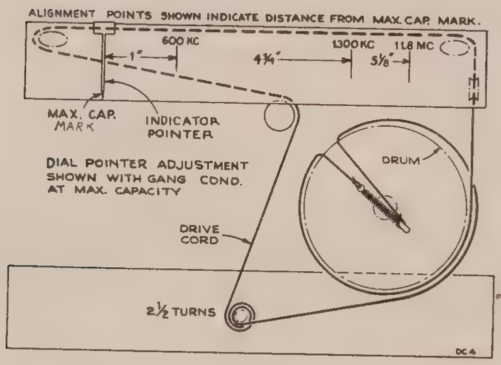
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Critical Lead Dress

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible
2. Dress R-F plate filter capacitor (C2, 0.1 mf.) back against rear chassis apron.
3. Dress yellow and brown leads from 2nd I-F away from all other leads.
4. Dress all heater leads next to chassis.
5. Dress capacitor (C13, .01 mf.) parallel to osc. coil and approximately 3/16 inch from coil.
6. Dress tone control lead and speaker field leads next to chassis and front apron.
7. Dress pilot lamp leads away from ant. coil.
8. Dress leads from loop ant. coil around rectifier tube towards end of chassis.
9. Dress output plate lead against chassis.


C 20 1300 KC
C29 11.8 MC
C30 600 KC
C 22 11.8 MC.
ANT. COIL
C 28 1300 KC
C 21 RF
C 27 OSC.
OSC.
OSC.
1ST I F TRANS.
2ND I F TRANS.
35L6 GT
35Z5 GT
12SG7
12SA7
12SK7
12SQ7
C 23 C 24 455 KC
C 25 C 26 455 KC.
TV5A


ALIGNMENT POINTS SHOWN INDICATE DISTANCE FROM MAX. CAP. MARK.
600 KC
1300KC
11.8 MC
1"
4¾"
5⅜"
MAX. CAP. MARK
INDICATOR POINTER
DIAL POINTER ADJUSTMENT SHOWN WITH GANG COND. AT MAX. CAPACITY
DRUM
DRIVE CORD
2½ TURNS
DC4

Output Transformer Color Coding.—The lead coloring on the output transformer may not correspond with the coloring given on the schematic. It is therefore necessary to rely on resistance measurements to determine lead connections, rather than the color coding given on the schematic.

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf. capacitor to common "–B." Keep the output signal as low as possible to avoid A.V.C. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum clockwise position, station selector switch to broadcast maximum high position (pos. 1), for broadcast alignment and to position 3 for high frequency band.

Dial Pointer Adjustment.—Rotate tuning condenser fully counterclockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

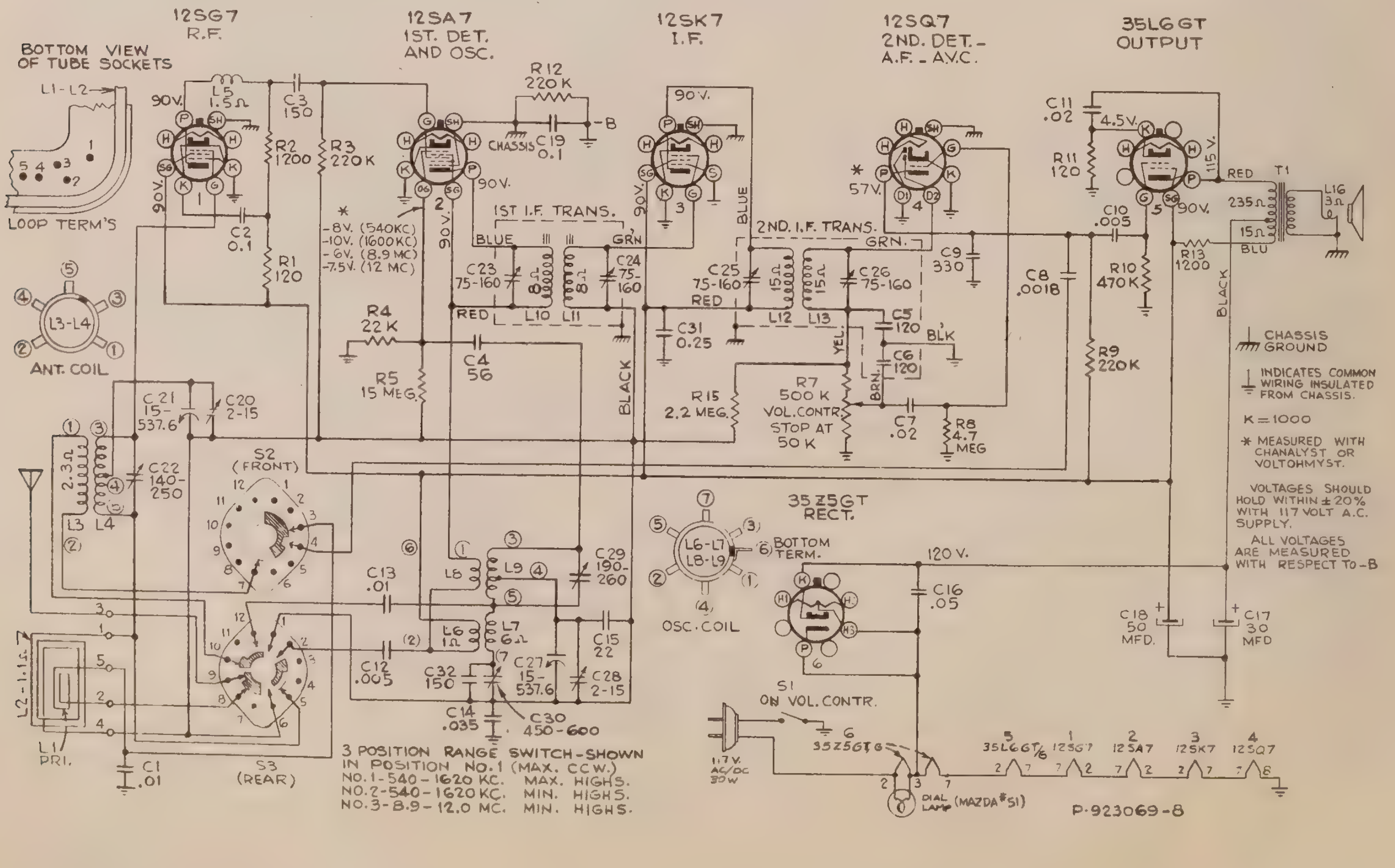
Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Pin #8 of 12SA7 in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C25, C26 2nd I-F trans.
2				C23, C24† 1st I-F trans.
3	Ant. terminal in series with 220 mmf.	600 kc	600 kc "A" Band	C30 (osc.) Rock gang
4		1300 kc	1300 kc "A" Band	C28 (osc.) C20 (R-F)
5		Repeat 3 Rocking gang		
6		Repeat 3, 4 and 5 for exact cal.		
7	Ant. terminal in series with 0.1 mfd.	11.8 mc	11.8 mc	C29 (osc.)* Rock gang
8	Ant. terminal in series with 47 mmf.	11.8 mc	11.8 mc	C22 (R-F) Rock gang
9	Repeat steps 7 and 8			

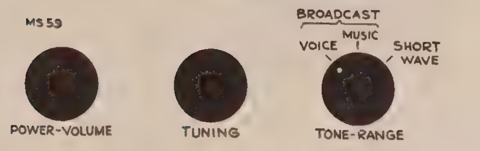
* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning receiver to approximately 10.9 mc where a weaker signal should be received.

† Do not readjust C25 or C26.


12SG7 R.F.
12SA7 1ST. DET. AND OSC.
12SK7 I.F.
12SQ7 2ND. DET. - A.F. - A.V.C.
35L6GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
L1-L2
LOOP TERM'S
L3-L4
ANT. COIL
L5 1.5Ω
C3 150
R2 1700
R3 220 K
C2 0.1
R1 120
R12 220 K
C19 0.1
CHASSIS
-B
90V.
-8V. (540KC)
-10V. (1600KC)
-6V. (8.9 MC)
-7.5V. (12 MC)
1ST I.F. TRANS.
BLUE
GRN
RED
C23 75-160
C24 75-160
L10 L11
R4 22 K
R5 15 MEG.
C4 56
BLACK
C31 0.25
2ND. I.F. TRANS.
C25 75-160
C26 75-160
L12 L13
C5 120
C6 120
BLK
YEL.
BRN.
R15 2.2 MEG.
R7 500 K VOL. CONTR. STOP AT 50 K
C7 .02
R8 4.7 MEG
C9 330
C8 .0018
57V.
C11 .02
4.5V.
R11 120
C10 .005
R10 470K
R9 220K
R13 1200
115V.
RED
T1
235Ω
15Ω
BLU
L16 3Ω
BLACK
C21 15-537.6
C20 2-15
C22 140-250
2.3Ω
S2 (FRONT)
C13 .01
L8
L9
C29 190-260
L6 1Ω
L7 6Ω
C15 22
C12 .005
C32 150
C27 15-537.6
C28 2-15
C14 .035
C30 450-600
L2-1.1Ω
L1 PRI.
C1 .01
S3 (REAR)
3 POSITION RANGE SWITCH-SHOWN IN POSITION NO.1 (MAX. C.C.W.)
NO.1-540-1620 KC. MAX. HIGHS.
NO.2-540-1620 KC. MIN. HIGHS.
NO.3-8.9-12.0 MC. MIN. HIGHS.
L6-L7 L8-L9
OSC. COIL
BOTTOM TERM.
35Z5GT RECT.
120 V.
C16 .05
C18 50 MFD.
C17 30 MFD
S1 ON VOL. CONTR.
117 V. AC/DC 30W
35Z5GT
35L6GT
12SG7
12SA7
12SK7
12SQ7
DIAL LAMP (MAZDA #51)
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
K=1000
* MEASURED WITH CHANALYST OR VOLTOHMYST.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 VOLT A.C. SUPPLY.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO -B
P-923069-8

Note: On some sets C31 may be 0.1 mfd. or 0.2 mfd., C9 may be connected to 12SQ7 grid. R15 may be 3.3 meg.

On some sets R5 is omitted



Dial Controls

RCA VICTOR

56X11

Chassis No. RC-1023A; Mfr. No. 274

SERVICE DATA

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.
—1945 No. 3—

Model 56X11 is manufactured expressly for sale to members of the U. S. Armed Forces

Electrical and Mechanical Specifications

Frequency Range

Broadcast....540-1,600 kc
Short Wave....9.4-15.5 mc
Intermediate Frequency....455 kc

Tube-Complement

(1) RCA-12SG7....R-F Amplifier
(2) RCA-12SA7....1st Det.—Osc.
(3) RCA-12SK7....I-F Amplifier
(4) RCA-12SQ7....2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT....Power Output
(6) RCA-35Z5-GT....Rectifier

Pilot Lamp....Mazda No. 51, 6-8 volts, 0.2 amp.

Power Output

Undistorted....1.0 watts
Maximum....1.5 watts

Loudspeaker 92510-1

Size....5-inch PM
V.C. Impedance....3.4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC....30 watts

Cabinet Dimensions

Width 12 3/16″....Height 7⅝″....Depth 7¼″

Volume Control

On some sets the 500,000 ohm volume control is not furnished with a stop 50,000 ohms from the high end of the control. Volume controls having no stop can be identified by a dot of red lacquer on the left side of the control, viewing the shaft end with terminals up. In models using this control, a 56,000 ohm ½ watt resistor, completely covered with spaghetti tubing, is connected between the high end of the control and the yellow lead on the second i-f transformer.

Replacement controls equipped with a stop do not need this external 56,000 ohm resistor, so when replacing a volume control, check the resistance between the arm and the high end of the replacement control with the arm turned fully clockwise. A reading of 50,000 ohms will indicate that the control is equipped with a stop, and that the 56,000 ohm resistor in the set should be removed before installing the new control.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1023A
32979	Capacitor—Mica trimmer, 15-150 mmf. (C20)
37388	Capacitor—Mica trimmer, 50-300 mmf. (C23)
70701	Capacitor—Mica trimmer, 1 section 500-750 mmf. and 1 section 10-50 mmf. (C25, C24)
39612	Capacitor—Mica, 22 mmf. (C26)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3)
39640	Capacitor—Mica, 330 mmf. (C9)
71014	Capacitor—Silver Mica, 220 mmf. (C29)
70712	Capacitor—Tubular, .0018 mfd., 800 volts (C8)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C10)
70652	Capacitor—Tubular, .01 mfd., 1000 volts (C1)
70711	Capacitor—Tubular, .02 mfd., 700 volts (C7, C11)
70635	Capacitor—Tubular, .035 mfd., 600 volts (C14)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C16)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C19)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C31)
36301	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C17, C18)
70842	Coil—Antenna coil (L3, L4)
70843	Coil—Oscillator coil (L6, L7, L8, L9)
39894	Coil—Peaking coil (L5)
70700	Condenser—Variable tuning condenser (C21, C22, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
70392	Cord—Power cord
32634	Cord—Drive cord (approx. 49″ overall length)
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp (Mazda 51)
31193	Lead—Antenna lead
70841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with pulleys
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
12267	Resistor—1200 ohms, ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30271	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Dial lamp socket
37605	Socket—Tube socket—moulded
31418	Spring—Drive cord spring
70696	Switch—Range switch (S2, S3)
70697	Transformer—Audio transformer (T1)
70698	Transformer—First I.F. transformer (L10, L11, C32, C33)
70699	Transformer—Second I.F. transformer (C34, C35, L12, L13)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	92510-1T 92510-1L 92510-1P 92510-1M
70413	Speaker—5″ P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back
70702	Dial—Glass dial scale
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
37831	Fastener—Push fastener for cabinet back (1 set)
36722	Knob—Control knob
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

56X11

Alignment Procedure

Test Oscillator.—For all alignment operations, keep the output as low as possible to avoid a.v.c. action.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

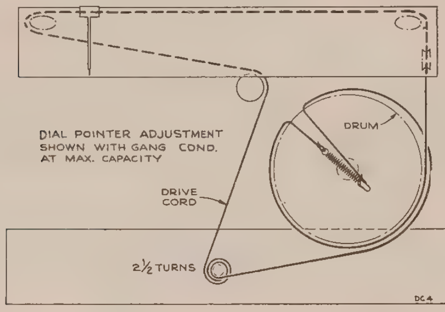
Critical Lead Dress

1. Dress all heater leads down to chassis.
2. Dress excess leads from I.F. transformers back into cans, also blue and green leads should be dressed near to chassis.
3. Lead from band switch, terminal four, to C-24, should be dressed toward front apron and just clear of oscillator coil.
4. C-29, on band switch, connected from terminal three to terminal four, should be dressed toward rear of switch assembly.
5. Excess dial lamp leads should be dressed on top of chassis.
6. C-11, output tone control condenser, should be dressed close to chassis to clear when entering cabinet.
7. Power cord should be dressed free, and not under any other leads.
8. C-4 should be dressed clear of any other components or wiring and away from chassis.
9. Lead from tone control condenser, C-8, to band switch terminal five, should be dressed over oscillator coil and oscillator padders C-24, C-25.
10. Lead from short-wave antenna coil to loop antenna should be to the right (outside) of 35Z5GT/G.
11. Leads to loop antenna should be dressed between I.F. transformer and 12SA7.
12. Yellow and brown leads from second I.F. transformer to volume control should be dressed up and away from chassis.

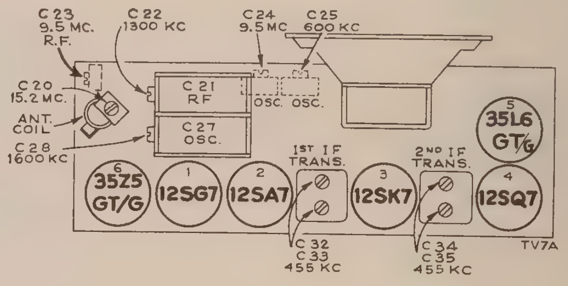
Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I.F. grid in series with .01 mfd.	455 kc	'A' Band Quiet point at 1600 kc end of dial	C34, C35 2nd I-F trans.
2	12SA7 grid in series with .01 mfd.			C32, C33 † 1st I-F trans.
3	Antenna terminal on loop in series with 220 mmf.	600 kc	'A' Band rock gang near 600 kc	C25 (BC trimmer)
4		1600 kc	1600 kc	C28 (Osc.)
5		600 kc	Rock gang near 600 kc	Recheck C25
6		1300 kc	1300 kc	C22 (r.f.)
7	Antenna terminal on loop in series with 22 mmf.	15.2 mc.	'C' Band rock gang near 15.2 mc.	C20 (ant.) on top of S.W. ant. coil
8			15.2 mc. center of "M"—"19M"	C24 (Osc.)*
9		9.5 mc.	9.5 mc.	C23 (r.f.)
10		15.2 mc.	15.2 mc.	Recheck C20

*Use minimum capacity peak, if two peaks can be obtained.
Note.—Oscillator tracks 455 kc above signal on both bands.

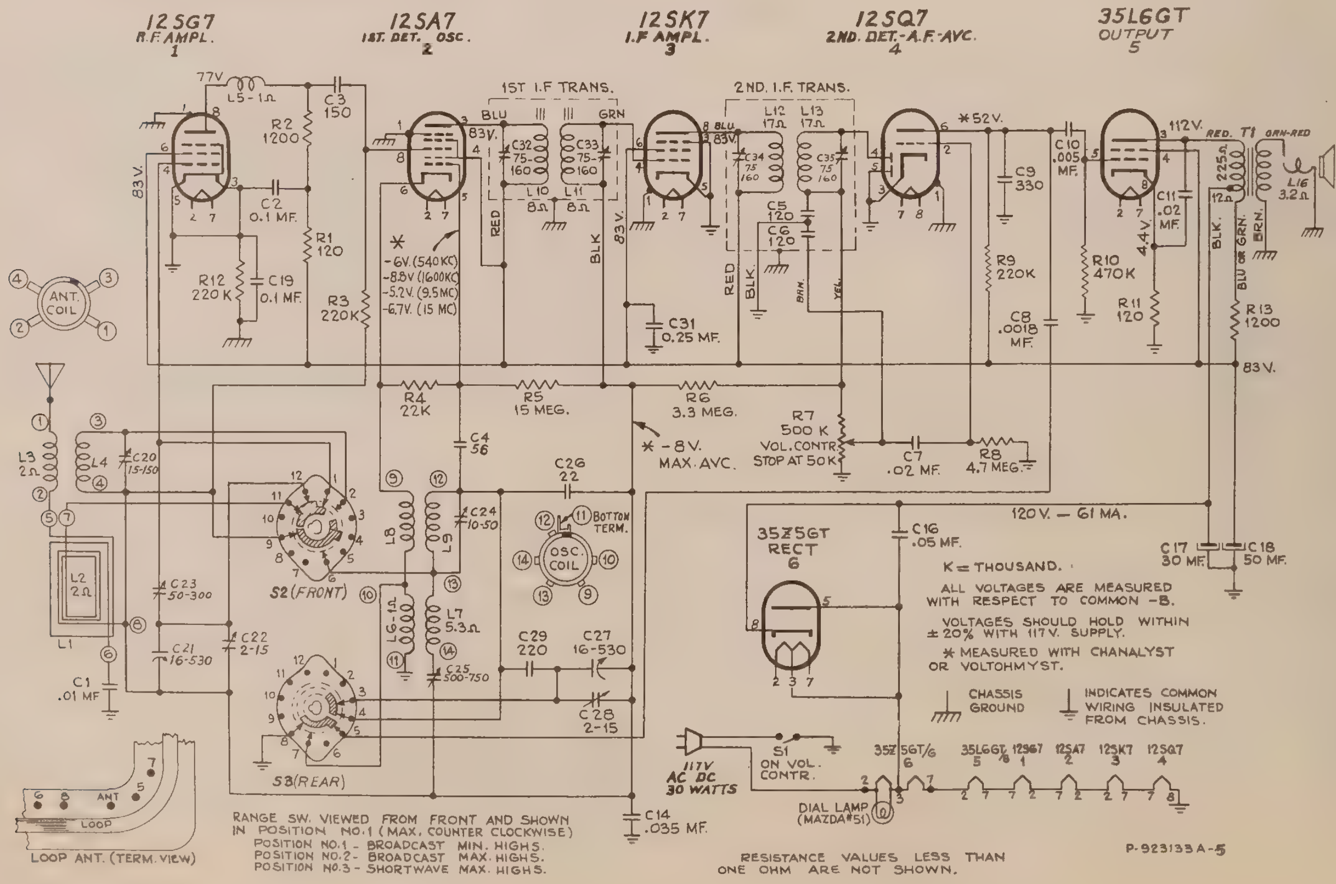
†Do Not Readjust C32 or C33.


DIAL POINTER ADJUSTMENT SHOWN WITH GANG COND. AT MAX. CAPACITY
DRUM
DRIVE CORD
2½ TURNS
DC4

Dial Indicator and Drive Mechanism


C23 9.5 MC. R.F.
C22 1300 KC
C24 9.5 MC
C25 600 KC
C20 15.2 MC.
ANT. COIL
C28 1600 KC
C21 RF
C27 OSC.
OSC. OSC.
1ST IF TRANS.
2ND IF TRANS.
6 35Z5 GT/G
1 12SG7
2 12SA7
3 12SK7
4 12SQ7
5 35L6 GT/G
C32 C33 455 KC
C34 C35 455 KC
TV7A

Tube and Trimmer Locations


12SG7 R.F. AMPL. 1
12SA7 1ST. DET. OSC. 2
12SK7 I.F. AMPL. 3
12SQ7 2ND. DET.-A.F.-AVC. 4
35L6GT OUTPUT 5
77V.
L5-1Ω
C3 150
R2 1200
83 V.
C2 0.1 MF.
R1 120
R12 220 K
C19 0.1 MF.
R3 220K
1ST I.F TRANS.
BLU GRN
83V.
C32 75-160
C33 75-160
L10 8Ω
L11 8Ω
RED
BLK
* -6V. (540KC) -8.8V (1600KC) -5.2V. (9.5MC) -6.7V. (15 MC)
2ND. I.F. TRANS.
L12 17Ω
L13 17Ω
C34 75 160
C35 75 160
C5 120
C6 120
C31 0.25 MF.
BRN.
YEL.
*52V.
C10 .005 MF.
C9 330
R9 220K
C8 .0018 MF.
R10 470K
4.4V
R11 120
112V.
RED. T1 GRN-RED
225Ω
12Ω
L16 3.2Ω
C11 .02 MF.
BLK. BLU OR GRN. BRN.
R13 1200
83V.
ANT. COIL
L3 2Ω
L4
C20 15-150
R4 22K
R5 15 MEG.
R6 3.3 MEG.
C4 56
* -8V. MAX. AVC.
R7 500 K VOL. CONTR. STOP AT 50K
C7 .02 MF.
R8 4.7 MEG.
C26 22
L2 2Ω
L1
C23 50-300
C21 16-530
C22 2-15
C1 .01 MF
S2 (FRONT)
L8
L9
C24 10-50
BOTTOM TERM.
OSC. COIL
L6-1Ω
L7 5.3Ω
C25 500-750
C29 220
C27 16-530
C28 2-15
S3 (REAR)
C16 .05 MF.
120V. — 61 MA.
35Z5GT RECT 6
C17 30 MF.
C18 50 MF.
K = THOUSAND.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
LOOP ANT. (TERM. VIEW)
ANT
LOOP
RANGE SW. VIEWED FROM FRONT AND SHOWN IN POSITION NO. 1 (MAX. COUNTER CLOCKWISE)
POSITION NO. 1 - BROADCAST MIN. HIGHS.
POSITION NO. 2 - BROADCAST MAX. HIGHS.
POSITION NO. 3 - SHORTWAVE MAX. HIGHS.
C14 .035 MF.
117V AC DC 30 WATTS
S1 ON VOL. CONTR.
DIAL LAMP (MAZDA #51)
35Z5GT/G 6
35L6GT 5
12SG7 1
12SA7 2
12SK7 3
12SQ7 4
RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
P-923133A-5

Note: On some models, electrolytic capacitor (C17, C18) may be 20 Mfd./30 Mfd. The AVC bypass capacitor, (C14) may be .030 Mf.

C31 may be 0.1 mfd. or 0.2 mfd., use values specified in parts list.

RCA VICTOR

VICTROLA 58V, 58AV

Radio-Phonograph Combination

Chassis No. RC-604, Mfr. No. 274

FOR AUTOMATIC CHANGER INFORMATION
REFER TO SERVICE DATA FOR MODEL 960001-1

SERVICE DATA

—1945 No. 8—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

MODEL 58V, 58AV

Specifications

Dimensions

	Cabinet	Chassis (overall)
Height (inches)	35⅜	7
Width (inches)	34³⁄₁₆	11¼
Depth (inches)	18⅛	10½
Tuning Drive Ratio		18-1

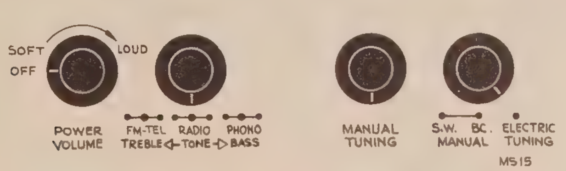
Frequency Ranges

Standard Broadcast "A"	540-1,600 kc
Short Wave "C"	9.4-15.4 mc

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SG7	R-F Amplifier
(2) RCA-6SA7	1st Det., Oscillator
(3) RCA-6SK7	I-F Amplifier
(4) RCA-6SQ7	2nd Det., A.V.C. and A-F Amplifier
(5) RCA-6SQ7	Phase Inverter
(6) RCA-6K6GT/G	Power Output
(7) RCA-6K6GT/G	Power Output
(8) RCA-5Y3GT/G	Rectifier



LOCATION OF CONTROLS

FOR INFORMATION ON AUTOMATIC CHANGER MECHANISM REFER TO SERVICE DATA FOR MODEL 960001-1 MECHANISM.

Power Supply Rating

105-125 volts, 60 cycles .... 115 watts

Pilot Lamps	(2) Mazda No. 51, 6-8 volts, 0.2 amps.
Compartment Lamp	(1) Mazda No. 55, 6-8 volts, 0.4 amps.

Loudspeaker

Type	Electrodynamic
Size	12-inch
V.C. impedance at 400 cycles	2.2 ohms

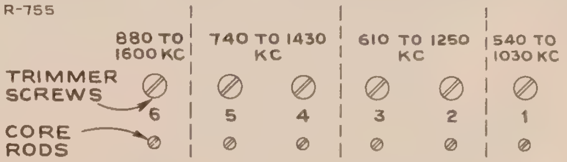
Power Output Rating

Undistorted	5 watts
Maximum	5.5 watts

Phonograph*

Type	Automatic 960001-1
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable	78 r.p.m. type
Type Pickup	Crystal
Motor Power consumption (125 v.-60 cycles)	30 watts

*This mechanism can be converted to operate on 50 cycles.



PUSH BUTTON ADJUSTMENT.—

The push buttons connect to separate magnetite-core oscillator coils and separate ant. circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

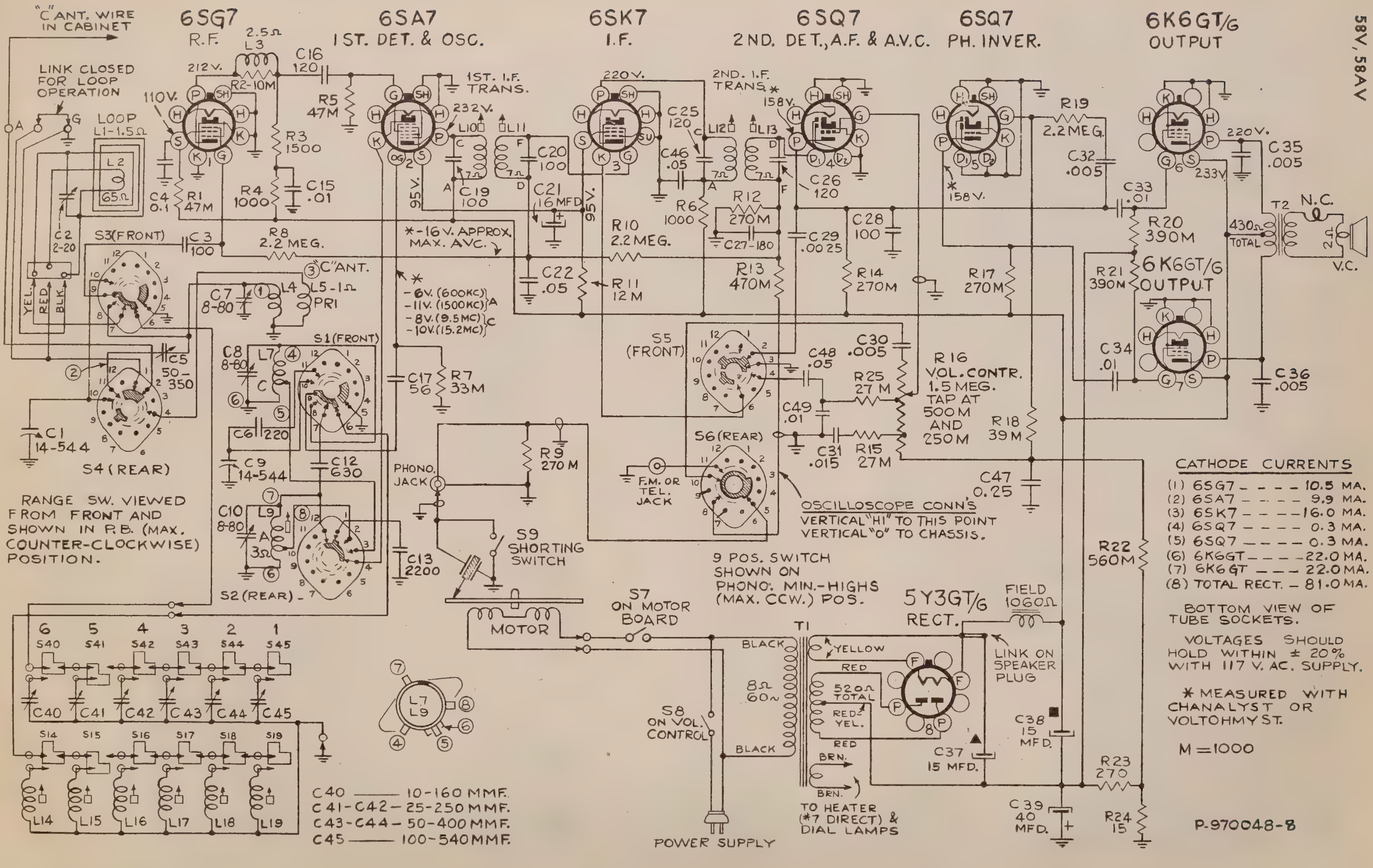
The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust No. 1 oscillator core to receive the first station. To secure the best adjustment, rotate the antenna for least pickup, and adjust core for peak output.
5. Adjust No. 1 antenna trimmer capacitor for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with osc. core either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

SERVICE HINT:—If unable to reach 550-540 KC on No. 1 push button —Connect a Stock No. 33111 Capacitor-Ceramic-33 mmf across L19 (between switch contact which connects to high side of L19, and switch frame).


"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
LOOP L1-1.5Ω
L2
65Ω
C2 2-20
YEL.
RED
BLK.
6SG7 R.F.
212V.
110V.
2.5Ω L3
R2-10M
C4 0.1
R1 47M
C16 120
R5 47M
R3 1500
R4 1000
C15 .01
S3(FRONT)
C3 100
R8 2.2 MEG.
C5 50-350
C1 14-544
S4 (REAR)
RANGE SW. VIEWED FROM FRONT AND SHOWN IN R.B. (MAX. COUNTER-CLOCKWISE) POSITION.
6SA7 1ST. DET. & OSC.
1ST. I.F. TRANS.
232V.
95V.
L10
L11
C19 100
C20 100
C21 16MFD
*-16V. APPROX. MAX. AVC.
"C" ANT.
L5-1Ω PRI
L4
C7 8-80
* -6V. (600KC) -11V. (1500KC) A -8V. (9.5MC) -10V. (15.2MC) C
S1 (FRONT)
C8 8-80
L7
C6 220
C9 14-544
C12 630
C10 8-80
L9
3Ω
S2 (REAR)
C17 56
R7 33M
C13 2200
6SK7 I.F.
220V.
95V.
C22 .05
R10 2.2MEG.
R11 12M
C25 120
C46 .05
R6 1000
L12
2ND. I.F. TRANS.*
L13
158V.
R12 270M
C27-180
R13 470M
C26 120
6SQ7 2ND. DET., A.F. & A.V.C.
C29 .0025
C28 100
R14 270M
6SQ7 PH. INVER.
158V.
R17 270M
R19 2.2MEG.
C32 .005
C33 .01
R20 390M
R21 390M
6K6GT/G OUTPUT
220V.
233V.
C35 .005
C34 .01
C36 .005
T2
N.C.
430Ω TOTAL
V.C.
S5 (FRONT)
C48 .05
C30 .005
R25 27M
C49 .01
C31 .015
R15 27M
R16 VOL. CONTR. 1.5 MEG. TAP AT 500M AND 250M
R18 39M
C47 0.25
S6 (REAR)
F.M. OR TEL. JACK
OSCILLOSCOPE CONN'S VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS.
9 POS. SWITCH SHOWN ON PHONO. MIN.-HIGHS (MAX. CCW.) POS.
PHONO. JACK
R9 270 M
S9 SHORTING SWITCH
MOTOR
S7 ON MOTOR BOARD
S8 ON VOL. CONTROL
POWER SUPPLY
T1
BLACK
8Ω 60~
YELLOW
RED
52Ω TOTAL
RED-YEL.
BRN.
TO HEATER (*7 DIRECT) & DIAL LAMPS
5Y3GT/G RECT.
FIELD 1060Ω
LINK ON SPEAKER PLUG
C38 15 MFD.
C37 15 MFD.
C39 40 MFD.
R22 560M
R23 270
R24 15
6 5 4 3 2 1
S40 S41 S42 S43 S44 S45
C40 C41 C42 C43 C44 C45
S14 S15 S16 S17 S18 S19
L14 L15 L16 L17 L18 L19
L7 L9
C40 —— 10-160 MMF.
C41-C42 — 25-250 MMF.
C43-C44 — 50-400 MMF.
C45 —— 100-540 MMF.
CATHODE CURRENTS
(1) 6SG7 ---- 10.5 MA.
(2) 6SA7 ---- 9.9 MA.
(3) 6SK7 ---- 16.0 MA.
(4) 6SQ7 ---- 0.3 MA.
(5) 6SQ7 ---- 0.3 MA.
(6) 6K6GT ---- 22.0 MA.
(7) 6K6GT ---- 22.0 MA.
(8) TOTAL RECT. — 81.0 MA.
BOTTOM VIEW OF TUBE SOCKETS.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
M = 1000
P-970048-8

Note 1: On some loops C2 is connected from grounded side of loop to a tap on L1 (Sec.)

SCHEMATIC DIAGRAM

Note 2: On some sets the field coil resistance may be 1630 ohms, voltages and cathode currents correspondingly lower; on these sets C35 and C36 are .0035 mfd.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the full size scale printed in this service note can be used for reference.

Using Tuning Dial.—

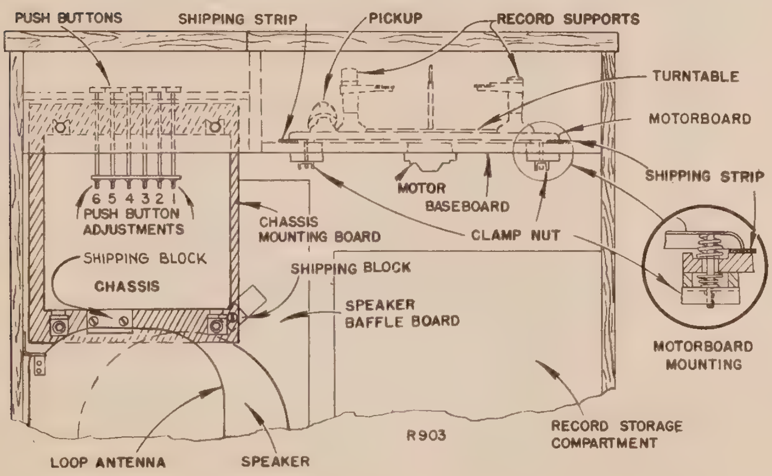
1. Remove glass dial from the cabinet.
2. With gang in full mesh, the dial pointer should be set to a point 1/16 inch to left of reference mark at left hand end of the dial backing plate.
3. Support the glass dial over the pointer with spacers so that the extreme left scale graduation coincides with the pointer. Use scotch tape to hold the glass dial in place.

"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C5 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer (C5) for best reception on 31-meter band.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect test-osc. output to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"A" band 540 kc	L13-L12 (2nd I-F trans.)
2	1st Det. grid in series with .01 mfd.			L11-L10 (1st I-F trans.)
3	A-Terminal in series with 47 mmfd. (link closed)	15.2 mc	"C" band 15.2 mc	C8 (osc.)* C7 (ant.)
4		9.5 mc	"C" band 9.5 mc	C5 (ant.) (Rock gang)
5		Repeat steps 3 and 4		
6	Yellow loop lead in series with 200 mmfd. (link closed)	1,500 kc	"A" band 1,500 kc	C10 (osc.)
7		600 kc	"A" band 600 kc	L9 (osc.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with antenna link closed. Tune in a radiated oscillator signal at 1,500 kc. and peak the "A" band trimmer C2 (on loop). Rock in L9 for peak output at 600 kc.			

*Use minimum capacity peak if two peaks can be obtained. Oscillator tracks 455 kc. above signal on all bands.

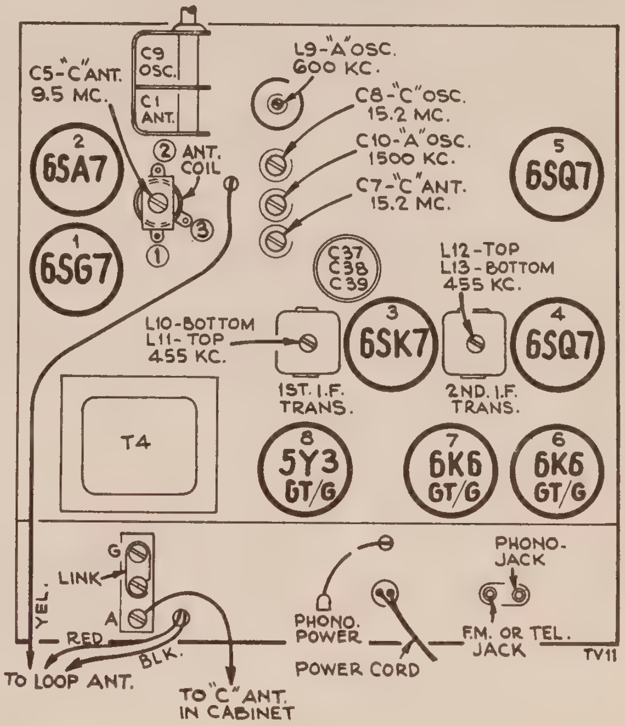

PUSH BUTTONS
SHIPPING STRIP
PICKUP
RECORD SUPPORTS
TURNTABLE
MOTORBOARD
SHIPPING STRIP
6 5 4 3 2 1
PUSH BUTTON ADJUSTMENTS
SHIPPING BLOCK
CHASSIS
CHASSIS MOUNTING BOARD
MOTOR
BASEBOARD
CLAMP NUT
SHIPPING BLOCK
SPEAKER BAFFLE BOARD
MOTORBOARD MOUNTING
R903
RECORD STORAGE COMPARTMENT
LOOP ANTENNA
SPEAKER

BACK VIEW

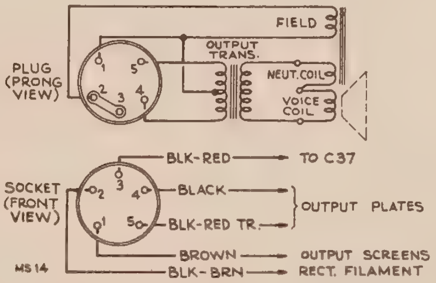
Critical Lead Dress:

1. Bus from "C" oscillator coil to range switch must be held to length and dressed close to coil.
2. C30 (audio coupling capacitor to volume control) should be dressed close to front apron.
3. A.C. cord and motor leads must be dressed away from phono and F.M. jack.
4. Excess trans. leads to be dressed between trans. and rectifier socket.
5. Keep R5, C16 bus (in grid circuit of 6SA7 tube) as short as possible.
6. Dress C28 (in plate circuit of 1st A.F.) close to socket.
7. Keep R21 (grid resistor) and C34 (coupling capacitor of output tube) close to socket.
8. Keep R25, C48 (in tone compensating circuit) close to front apron.
9. Dress green lead from osc. coil to trimmer close to oscillator coil.
10. Dress red A.C. leads away from I.F. trans. and 6SQ7 socket.
11. RF choke in plate of 6SG7 must be dressed toward back apron.

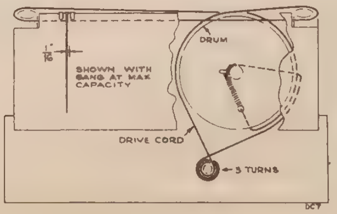
For Information on Automatic Mechanism refer to Service Data for Model 960001-1 Mechanism.


C9 OSC.
C1 ANT.
C5-"C"ANT. 9.5 MC.
L9-"A"OSC. 600 KC.
C8-"C"OSC. 15.2 MC.
C10-"A"OSC. 1500 KC.
C7-"C"ANT. 15.2 MC.
2 6SA7
② ANT. COIL
③
①
5 6SQ7
1 6SG7
C37 C38 C39
L12-TOP L13-BOTTOM 455 KC.
L10-BOTTOM L11-TOP 455 KC.
3 6SK7
4 6SQ7
1ST. I.F. TRANS.
2ND. I.F. TRANS.
T4
8 5Y3 GT/G
7 6K6 GT/G
6 6K6 GT/G
G
LINK
A
YEL.
RED
BLK.
PHONO. POWER
PHONO-JACK
F.M. OR TEL. JACK
TV11
TO LOOP ANT.
TO "C" ANT. IN CABINET
POWER CORD

TUBE AND TRIMMER LOCATIONS

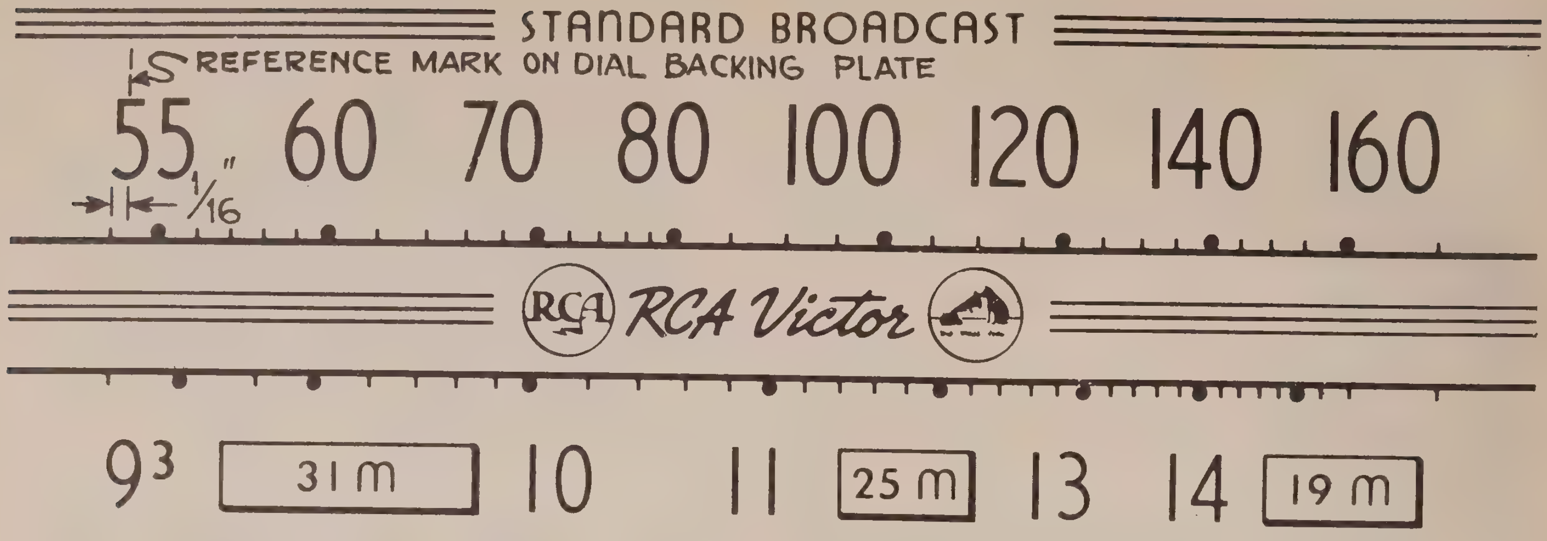

FIELD
OUTPUT TRANS.
PLUG (PRONG VIEW)
1 2 3 4 5
NEUT. COIL
VOICE COIL
SOCKET (FRONT VIEW)
BLK-RED
TO C37
BLACK
OUTPUT PLATES
BLK-RED TR.
BROWN
OUTPUT SCREENS
BLK-BRN
RECT. FILAMENT
MS 14

SPEAKER CONNECTIONS


DRUM
1"/16
SHOWN WITH GANG AT MAX CAPACITY
DRIVE CORD
3 TURNS
DC7

DIAL INDICATOR AND DRIVE MECHANISM

FULL SIZE REPRODUCTION OF DIAL SCALE



Replacement Parts

For Automatic Mechanism Parts refer to Service Data for Model 960001-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-604
36342	Board—"Antenna-Ground" board
38368	Capacitor—Adjustable, 50-350 mmfd. (C5)
60954	Capacitor—Ceramic, 56 mmfd. (C17)
38801	Capacitor—Mica trimmer, comprising 3 sections of 8-80 mmfd. (C7, C8, C10)
39628	Capacitor—Mica, 100 mmfd. (C3, C19, C20, C28)
39630	Capacitor—Mica, 120 mmfd. (C16, C25, C26)
39634	Capacitor—Mica, 180 mmfd. (C27)
38858	Capacitor—Silver mica, 220 mmfd. (C6)
38831	Capacitor—Silver mica, 630 mmfd. (C12)
39660	Capacitor—Mica, 2200 mmfd. (C13)
70623	Capacitor—Tubular, .0025 mfd., 600 volts (C29)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C30, C32)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C35, C36)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C15, C33, C34, C49)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C31)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C22, C48)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C-46)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C4)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C47)
37888	Capacitor—Electrolytic comprising 2 sections of 20 mfd., 450 volts and 1 section of 20 mfd., 25 volts replacement for (C37, C38, C39)
37877	Capacitor—Electrolytic, 16 mfd., 450 volts (C21)
38788	Coil—Antenna coil, "C" band (L4, L5)
38787	Coil—Oscillator coil (L7, L9)
38800	Condenser—Variable tuning condenser (C1, C9)
70342	Control—Volume control and power switch (R16, S8)
32634	Cord—Drive cord (approx. 43″ overall length)
12006	Core—Adjustable core and stud assembly for I.F. transformer
35788	Core—Adjustable core and stud for oscillator coil
38359	Cup—Oscillator coil mounting cup
38790	Drum—Drive drum
35870	Indicator—Station selector pointer
28452	Plate—Bakelite mounting plate for electrolytic capacitor
36333	Plate—Dial back plate complete with pulleys
38832	Plug—Pin plug for loop lead
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
32641	Plug—3 prong male plug for selector switch cable
32289	Pulley—Drive cord pulley
11565	Resistor—15 ohms, ½ watt (R24)
70542	Resistor—270 ohms, 4 watt (R23)
34766	Resistor—1000 ohms, ½ watt (R4, R6)
30654	Resistor—1500 ohms, ½ watt (R3)
38829	Resistor—Resistor and coil assembly, 10,000 ohms (R2, L3)
70541	Resistor—12,000 ohms, 4 watt (R11)
30409	Resistor—27,000 ohms, ½ watt (R15, R25)
30685	Resistor—33,000 ohms, ½ watt (R7)
30147	Resistor—39,000 ohms, ½ watt (R18)
30787	Resistor—47,000 ohms, ½ watt (R1, R5)
30651	Resistor—270,000 ohms, ½ watt (R9, R12, R14, R17)
11988	Resistor—390,000 ohms, ½ watt (R20, R21)
30648	Resistor—470,000 ohms, ½ watt (R13)
30653	Resistor—560,000 ohms, ½ watt (R22)
30649	Resistor—2.2 megohm, ½ watt (R8, R10, R19)
38803	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
33514	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
12007	Spring—Retaining spring for adjustable core and studs
38802	Switch—Radio-phono and tone control switch (S5, S6)
38805	Switch—Range switch (S1, S2, S3, S4)
31380	Transformer—Power transformer—105-125 volts, 50/60 cycle (T1)
35636	Transformer—First I.F. transformer (L10, L11, C19, C20)
35790	Transformer—Second I.F. transformer (L12, L13, C25, C26)
35969	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES Stamped 92512-1K
70574	Cone—Cone and voice coil assembly
31539	Plug—5 prong male plug for speaker cable
70573	Speaker—12″ E.M. speaker complete with cone and voice coil less plug and output transformer
37899	Transformer—Output transformer (T2)
	Stamped 92566-1W RL70R2
13867	Cap—Dust Cap
71147	Clamp—Clamp to hold metal cone suspension (2 req'd)
12079	Coil—Field coil—1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5 prong male plug
71145	Suspension—Metal cone suspension
36671	Transformer—Output transformer (T2)
	NOTE: If stamping on speaker in instruments does not agree with above speaker number, order replacement parts by referring to Model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36461	Button—Plug button
38375	Button—Push button
38684	Capacitor—Trimmer, 2-20 mmfd. (C2)
36424	Capacitor—Mica trimmer comprising 1 section of 10-160 mmfd., 2 sections of 25-250 mmfd., 2 sections of 50-400 mmfd., and 1 section of 100-540 mmfd. (C40, C41, C42, C43, C44, C45)
36462	Clamp—Dial clamp
X1609	Cloth—Grille cloth for Mahogany cabinet
X1610	Cloth—Grille cloth for Walnut cabinet
38579	Coil—Loop primary coil (L2)
38315	Coil—P.B. oscillator coil—high frequency side (L14, L15, L16)
37638	Coil—P.B. oscillator coil—low frequency side (L17, L18, L19)
35871	Core—Adjustable core and stud for P.B. oscillator coil
70547	Cover—Compartment lamp lead cover
39013	Decal—Control panel decal
35392	Decal—Trade mark decal (RCA Victor)
70575	Decal—Trade mark decal (Dog)
39011	Dial—Glass dial scale
36327	Escutcheon—Dial escutcheon—less dial
38376	Escutcheon—Push button escutcheon—less buttons
71003	Grille—Metal grille
39352	Hinge—Cabinet door hinge
30698	Hinge—Cabinet lid hinge
13103	Jewel—Pilot lamp cap
71002	Knob—Cabinet door knob
35814	Knob—Tone control, range switch, volume control, or tuning knob
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
70544	Loop—Antenna loop complete (L1, L2, C2)
34317	Marker—Station marker
70546	Mounting—One (1) set of hardware for mounting record changer consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts
37800	Shade—Lamp shade
36422	Socket—3 contact female for selector switch cable and loop leads
30900	Spring—Retaining spring for control knobs
34053	Spring—Retaining spring for push button
71001	Spring—Spring for L.H. cabinet lid support
70999	Spring—Spring for R.H. cabinet lid support
71000	Support—Cabinet lid support—L.H.
70998	Support—Cabinet lid support—R.H.
70545	Support—Loop support complete with mounting brackets and spring
38575	Switch—Selector switch (S14, S15, S16, S17, S18, S19, S40, S41, S42, S43, S44, S45)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

VICTROLA 59V1, 59AV1

Radio-Phonograph Combination

Chassis No. RC 605; Mfr. No. 274

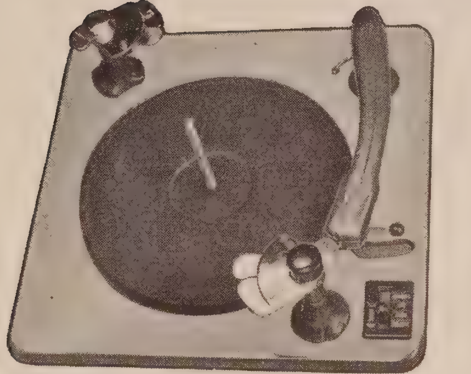
For Automatic Changer Information Refer to Service Data for Model 960001-2

SERVICE DATA

—1945 No. 6—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 59V1, 59AV1



AUTOMATIC CHANGER*

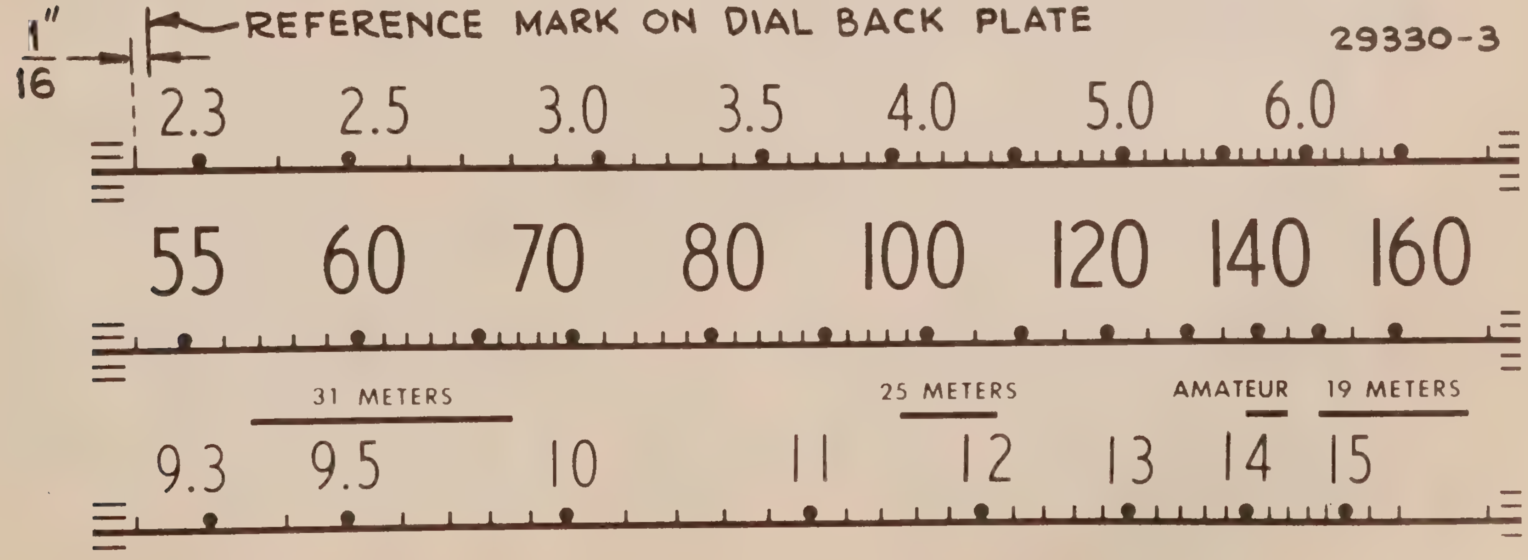
Type Pickup	Crystal
Record Capacity	Fourteen 10-in., Twelve 12-in.
Power Consumption (125 v., 60 cycles)	30 watts

*This instrument can be converted to operate on 50 cycles.

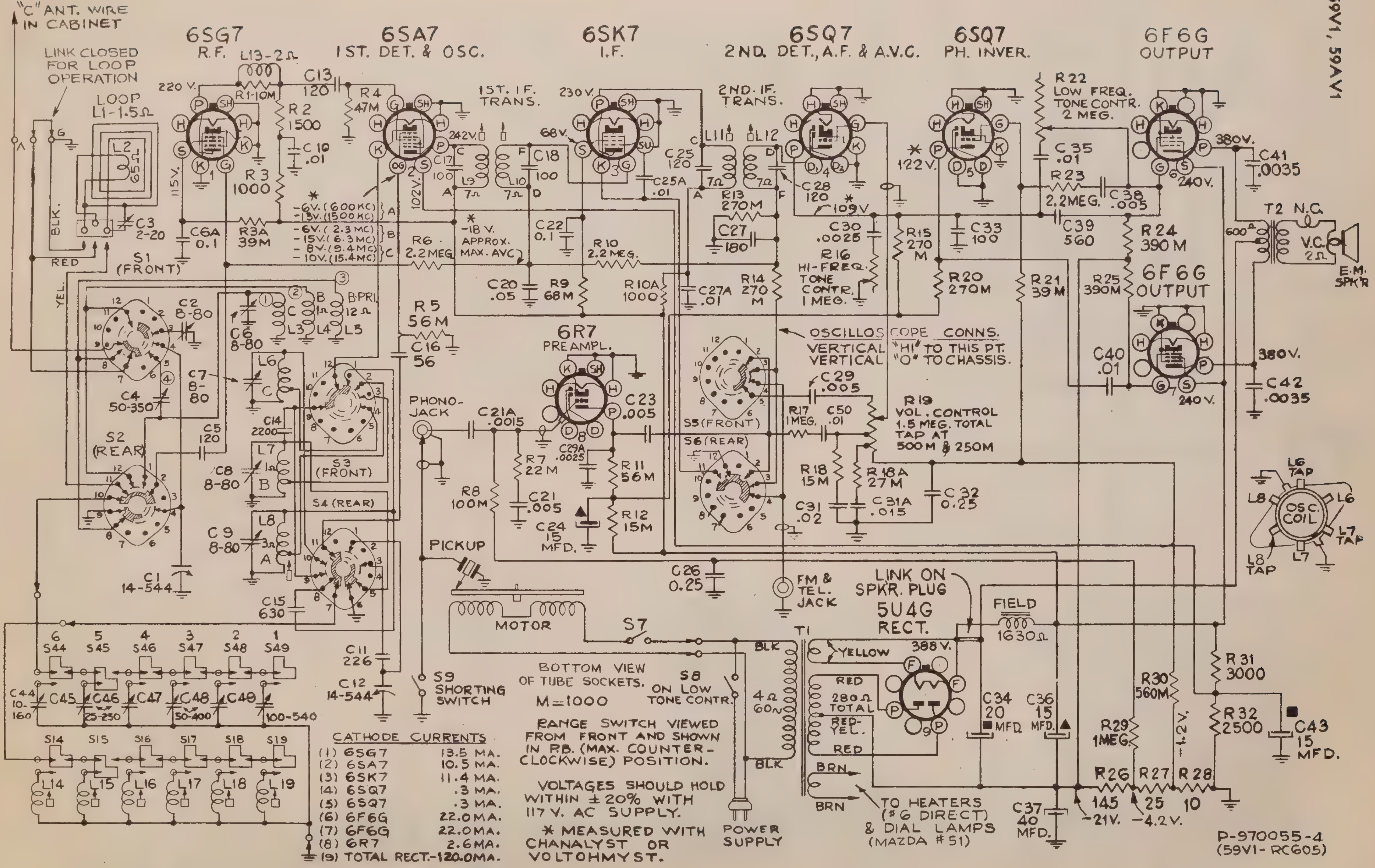
FOR ADDITIONAL INFORMATION REFER TO SERVICE DATA FOR MODEL 960001-2 MECHANISM.

Electrical and Mechanical Specifications

FREQUENCY RANGES	
Standard Broadcast (A)	540-1,600 kc
Medium Wave (B)	2,300-6,300 kc
Short Wave (C)	9,400-15,400 kc
Intermediate Frequency	455 kc
POWER OUTPUT RATING	
Undistorted	10 watts
Maximum	12 watts
LOUDSPEAKER	
Type	12-inch electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Identification Number	92513-1
POWER SUPPLY RATING	
105-125 volts, 50-60 cycles	145 watts
Pilot Lamps	(3) Mazda No. 51, 6-8 volts, 0.2 amps.
CHASSIS BASE DIMENSIONS (inches)	3 .. 11¼ .. 10½
Over-all Chassis Height (inches)	7
Tuning Drive Ratio	18-1
CABINET DIMENSIONS (inches)	
Width	35⅜
Depth	17⅞
Height	36 1/16


1"/16
REFERENCE MARK ON DIAL BACK PLATE
29330-3
2.3
2.5
3.0
3.5
4.0
5.0
6.0
55
60
70
80
100
120
140
160
31 METERS
25 METERS
AMATEUR
19 METERS
9.3
9.5
10
11
12
13
14
15

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.


"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
LOOP L1-1.5Ω
L2 65Ω
C3 2-20
BLK.
RED
YEL.
6SG7 R.F.
6SA7 1ST. DET. & OSC.
6SK7 I.F.
6SQ7 2ND. DET., A.F. & A.V.C.
6SQ7 PH. INVER.
6F6G OUTPUT
6F6G OUTPUT
6R7 PREAMPL.
5U4G RECT.
L13-2Ω
R1-10M
C13 120
R4 47M
R2 1500
C10 .01
R3 1000
R3A 39M
C6A 0.1
220 V.
115V.
242V.
102V.
230V.
68V.
-6V. (600KC) -13V. (1500KC) A
-6V. (2.3MC) -15V. (6.3MC) -8V. (9.4MC) -10V. (15.4MC) B C
* -18 V. APPROX. MAX. AVC
1ST. I.F. TRANS.
2ND. I.F. TRANS.
C17 100
L9 7Ω
L10 7Ω
C18 100
C22 0.1
R6 2.2MEG
R10 2.2MEG.
C20 .05
R9 68M
R10A 1000
C25 120
C25A .01
L11
L12
C27A .01
R13 270M
C27 180
R14 270 M
C28 120
* 109V
C30 .0025
R16 HI-FREQ. TONE CONTR. 1 MEG.
R15 270 M
* 122V.
C33 100
R20 270M
R21 39M
R22 LOW FREQ. TONE CONTR. 2 MEG.
C35 .01
R23 2.2MEG.
C38 .005
C39 560
R24 390 M
R25 390M
C40 .01
380V.
240V.
C41 .0035
C42 .0035
T2 N.C.
600Ω
V.C. 2Ω
E.M. SPK'R
S1 (FRONT)
S2 (REAR)
S3 (FRONT)
S4 (REAR)
S5 (FRONT)
S6 (REAR)
C2 8-80
C6 8-80
C7 8-80
C4 50-350
C5 120
C14 2200
C8 8-80
C9 8-80
C1 14-544
C15 630
C11 226
C12 14-544
L3
L4
L5
B PRI. 12Ω
L6
L7
L8
R5 56M
C16 56
PHONO-JACK
C21A .0015
R7 22M
R8 100M
C21 .005
C24 15 MFD.
C29A .0025
C23 .005
R11 56M
R12 15M
OSCILLOSCOPE CONNS.
VERTICAL "HI" TO THIS PT.
VERTICAL "O" TO CHASSIS.
C29 .005
R17 1MEG.
C50 .01
R19 VOL. CONTROL 1.5 MEG. TOTAL TAP AT 500M & 250M
R18 15M
R18A 27M
C31 .02
C31A .015
C32 0.25
C26 0.25
FM & TEL. JACK
PICKUP
MOTOR
S7
S8 ON LOW TONE CONTR.
S9 SHORTING SWITCH
LINK ON SPKR. PLUG
FIELD 1630Ω
388V.
YELLOW
RED
280Ω TOTAL
RED-YEL.
BRN
BLK
4Ω 60~
T1
POWER SUPPLY
TO HEATERS (#6 DIRECT) & DIAL LAMPS (MAZDA #51)
C34 20 MFD.
C36 15 MFD.
C37 40 MFD.
R30 560M
R29 1MEG.
R26 145
R27 25
R28 10
-21V.
-4.2V.
R31 3000
R32 2500
C43 15 MFD.
OSC. COIL
L6 TAP
L7 TAP
L8 TAP
S44 S45 S46 S47 S48 S49
6 5 4 3 2 1
C44 10-160
C45 C46 C47 C48 C49
25-250
50-400
100-540
S14 S15 S16 S17 S18 S19
L14 L15 L16 L17 L18 L19
CATHODE CURRENTS
(1) 6SG7 13.5 MA.
(2) 6SA7 10.5 MA.
(3) 6SK7 11.4 MA.
(4) 6SQ7 .3 MA.
(5) 6SQ7 .3 MA.
(6) 6F6G 22.0 MA.
(7) 6F6G 22.0 MA.
(8) 6R7 2.6 MA.
(9) TOTAL RECT.-120.0 MA.
BOTTOM VIEW OF TUBE SOCKETS.
M=1000
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN P.B. (MAX. COUNTER-CLOCKWISE) POSITION.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
P-970055-4 (59V1-RC605)

NOTE: Some antenna loops have a tap on the secondary and C3 is connected from this tap to the grounded side of the loop. On loops without the tap C3 is connected across the whole secondary. Alignment procedure is the same with either type loop, and they are interchangeable.

SCHEMATIC DIAGRAM—MODELS 59V1, 59AV1

NOTE: In RL70M2 speakers (92567-1)
Field coils 94136-501A are approx. 1300 ohms d.c.
Field coils 94136-501 are approx. 1630 ohms d.c.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the full size calibration scale printed in this service note can be used for reference.

Using Tuning Dial.—

1. Remove the dial glass from the cabinet.
2. With gang at full mesh the pointer should be set to a point (1/16) inch to the left of the reference mark at the left hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in place.

Using Dial Scale Printed In This Service Note.—

Follow the procedure above, substituting the dial scale printed in this service note for the glass dial in the cabinet.

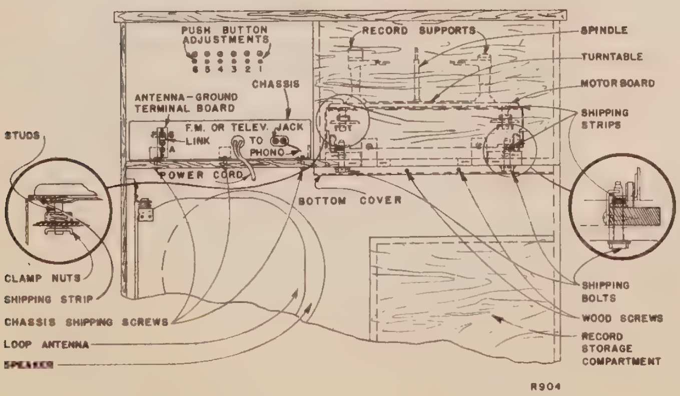
"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C4 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer (C4) for best reception on 31-meter band.

For additional information, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"A" Band 540 kc	L12, L11 (2nd I-F Trans.)
2	1st Det. grid in series with .01 mfd.			L10, L9 (1st I-F Trans.)
3	Yellow loop lead in series with 200 mmf. (link closed)	1,500 kc	"A" Band 1,500 kc	C9 (osc.)
4		600 kc	"A" Band 600 kc	L8 (osc.)
5		Repeat steps 3 and 4		
6	Ant. terminal in series with 47 mmf. (link closed)	6.1 mc	"B" Band 6.1 mc	C8 (osc.)* C2 (ant.)
7		15.2 mc	"C" Band 15.2 mc	C7 (osc.)* C6 (ant.)
8		9.5 mc	"C" Band 9.5 mc	C4 (ant.)
9		Repeat steps 7 and 8		
10	Install and connect chassis in cabinet, with link closed. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band ant. trimmer C3 (on loop). Rock in L8 for peak output at 600 kc.			

*Use minimum capacity peak if two peaks can be obtained.
Oscillator tracks 455 kc above signal on all bands.

FOR INFORMATION ON AUTOMATIC CHANGER REFER TO SERVICE DATA FOR MODEL 960001-2 MECHANISM.

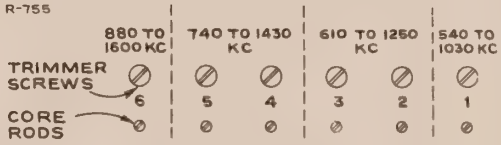

PUSH BUTTON ADJUSTMENTS
6 5 4 3 2 1
RECORD SUPPORTS
SPINDLE
TURNTABLE
MOTOR BOARD
CHASSIS
ANTENNA-GROUND TERMINAL BOARD
F.M. OR TELEV. JACK
LINK
A
TO PHONO
SHIPPING STRIPS
STUDS
POWER CORD
BOTTOM COVER
CLAMP NUTS
SHIPPING STRIP
CHASSIS SHIPPING SCREWS
LOOP ANTENNA
SPEAKER
SHIPPING BOLTS
WOOD SCREWS
RECORD STORAGE COMPARTMENT
R904

Back View

Critical Lead Dress

1. Push button, R.F. and oscillator leads should be separated as much as possible to reduce degeneration on push button reception.
2. R.F. choke in plate circuit of 6SG7 should be dressed towards the back apron.
3. Dress green push button lead under clamp and away from "C" band series capacitor.
4. Dress heater leads away from grids and diodes.
5. Dress phono. cables up and away from all wiring.
6. Dress all excess leads from transformer back towards transformer.
7. Keep output plate leads short and dressed close to chassis.
8. Dress green lead from 6SA7 screen to electrolytic down close to chassis.
9. Dress "C" band coil lead from oscillator coil to range switch down toward green lead.
10. Keep yellow loop lead clear of all wiring.
11. Dress ground bus of large electrolytic away from mounting lug.
12. Remove all excess slack from pilot light assembly and dress it close to chassis base away from volume control.
13. Dress oscillator grid capacitor (56 mmfd.) up and away from the screen and plate of 6SA7 socket.
14. A-C leads to "off-on" switch should be kept away from tone control cable to reduce hum.
15. Peaking coil should be dressed away from R-F grid resistor to reduce degeneration in R-F stage.
16. Dress oscillator push button lead in weld clamp on front apron away from 220 mmf. series condenser.
17. Keep all leads away from Phono.-FM jack to prevent audio oscillation and hum. Dress underneath the shield provided.

Push Button Adjustment


R-755
880 TO 1600 KC
740 TO 1430 KC
610 TO 1250 KC
540 TO 1030 KC
TRIMMER SCREWS
CORE RODS
6
5
4
3
2
1

The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

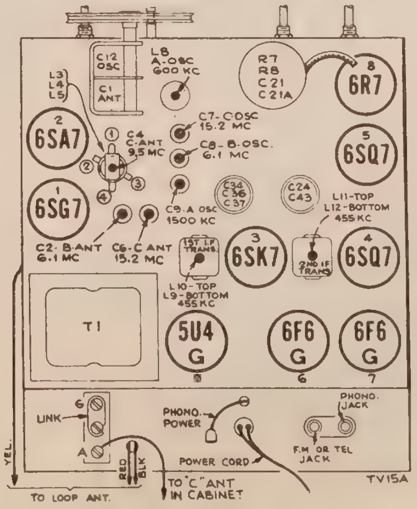
The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

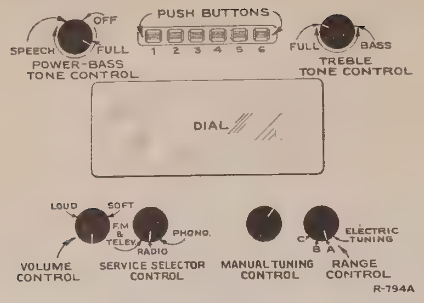
On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

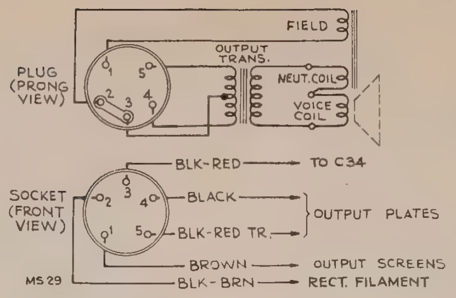
SERVICE HINT:—If unable to reach 550-540 KC on No. 1 push button —Connect a Stock No. 33111 Capacitor-Ceramic-33 mmf across L19 (between switch contact which connects to high side of L19, and switch frame).


C12 OSC
C1 ANT
L8 A-OSC 600 KC
R7 R8 C21 C21A
8 6R7
L3 L4 L5
2 6SA7
① ② ③ ④
C4 C-ANT 9,5 MC
C7-C-OSC 15.2 MC
C8-B-OSC. 6.1 MC
5 6SQ7
1 6SG7
C34 C36 C37
C24 C43
C9-A OSC 1500 KC
L11-TOP L12-BOTTOM 455 KC
C2-B-ANT 6.1 MC
C6-C ANT 15.2 MC
1ST I.F. TRANS.
3 6SK7
2ND IF TRANS
4 6SQ7
L10-TOP L9-BOTTOM 455 KC
T1
5U4 G
6F6 G 6
6F6 G 7
G
LINK
A
PHONO. POWER
PHONO. JACK
F.M. OR TEL JACK
POWER CORD
YEL.
RED
BLK
TO LOOP ANT.
TO "C" ANT IN CABINET
TV15A

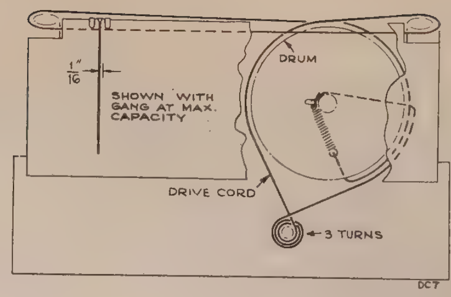
Top View Chassis



Front Panel Controls



Speaker Connections



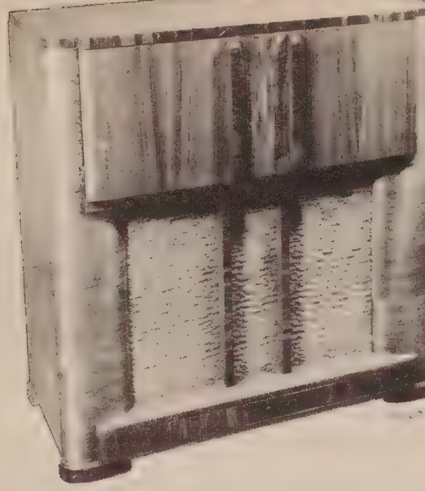
Dial Cord Drive

Replacement Parts

FOR AUTOMATIC MECHANISM PARTS REFER TO SERVICE DATA FOR MODEL 960001-2

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 605**
36342	Board—"Antenna-Ground" board
60954	Capacitor—Ceramic, 56 mmf. (C16)
38852	Capacitor—Mica trimmer comprising two (2) sections of 8-80 mmf. (C2, C6)
38801	Capacitor—Mica trimmer comprising three (3) sections of 8-80 mmf. (C7, C8, C9)
39628	Capacitor—Mica, 100 mmf. (C17, C18, C33)
39630	Capacitor—Mica, 120 mmf. (C5, C13, C25, C28)
39634	Capacitor—Mica, 180 mmf. (C27)
38830	Capacitor—Silver mica, 226 mmf. (C11)
38368	Capacitor—Mica trimmer, 50-350 mmf. (C4)
39646	Capacitor—Mica, 560 mmf. (C39)
38831	Capacitor—Mica, 630 mmf. (C15)
39660	Capacitor—Mica, 2200 mmf. (C14)
71394	Capacitor—Paper, .0015 mfd., 600 volts (C21A)
70623	Capacitor—Paper, .0025 mfd., 600 volts (C30, C29A)
70646	Capacitor—Paper, .0035 mfd. (C41, C42)
70606	Capacitor—Paper, .005 mfd., 400 volts (C21, C38)
70627	Capacitor—Paper, .005 mfd., 600 volts (C23, C29)
70610	Capacitor—Paper, .01 mfd., 400 volts (C50)
70631	Capacitor—Paper, .01 mfd., 600 volts (C10, C35, C40, C25A, C27A)
70611	Capacitor—Paper, .02 mfd., 400 volts (C31)
70615	Capacitor—Paper, .05 mfd., 400 volts (C20)
70617	Capacitor—Paper, 0.1 mfd., 400 volts (C22, C6A)
70618	Capacitor—Paper, 0.25 mfd., 200 volts (C26, C32)
34889	Capacitor—Electrolytic, comprising two (2) sections of 15 mfd., 450 volts (C24, C43)
34533	Capacitor—Electrolytic, comprising one (1) section of 20 mfd., 450 volts; one (1) section of 15 mfd., 350 volts; and one (1) section of 40 mfd., 25 volts (C34, C36, C37)
38367	Coil—Antenna coil, "B" and "C" band (L3, L4, L5)
38358	Coil—Oscillator coil (L6, L7, L8)
38800	Condenser—Variable tuning condenser (C1, C12)
36447	Control—Volume control (R19)
32634	Cord—Drive cord
12006	Core—Adjustable core and stud for first and second I.F. transformers
35788	Core—Adjustable core and stud for oscillator coil
38359	Cup—Mounting cup for oscillator coil
38790	Drum—Drive drum
35870	Indicator—Station selector indicator
28452	Plate—Bakelite mounting plate for capacitor #34533
36333	Plate—Dial back plate complete with pulleys less dial
30868	Plug—Two (2) contact female plug for motor cable
31572	Plug—Three (3) contact female plug for power cable
12493	Plug—Five (5) contact female plug speaker cable
38832	Plug—Pin plug for loop lead
32641	Plug—Three (3) prong male plug for selector cable
39153	Plug—Four (4) prong male plug for tone control cable
32289	Pulley—Drive cord pulley
34766	Resistor—1000 ohms, ½ watt (R3, R10A)
30654	Resistor—1500 ohms, ½ watt (R2)
38808	Resistor—Voltage divider comprising one (1) section of 3000 ohms, 9 watt; one (1) section of 2500 ohms, 4.2 watt; one (1) section of 10 ohms, 0.2 watt; one (1) section of 25 ohms, 0.5 watt; and one (1) section of 145 ohms, 3 watt (R26, R27, R28, R31, R32)
35876	Resistor—Resistor and coil assembly, 10,000 ohms (R1, L13)
36714	Resistor—15,000 ohms, ½ watt (R12, R18)
30492	Resistor—22,000 ohms, ½ watt (R7)
30409	Resistor—27,000 ohms, ½ watt (R18A)
30147	Resistor—39,000 ohms, ½ watt (R21, R3A)
30787	Resistor—47,000 ohms, ½ watt (R4)
30650	Resistor—56,000 ohms, ½ watt (R5, R11)
14138	Resistor—68,000 ohms, ½ watt (R9)
3252	Resistor—100,000 ohms, ½ watt (R8)
30651	Resistor—270,000 ohms, ½ watt (R13, R14, R15, R20)
11988	Resistor—390,000 ohms, ½ watt (R24, R25)
30653	Resistor—560,000 ohms, ½ watt (R30)
30652	Resistor—1 megohm, ½ watt (R17, R29)
30649	Resistor—2.2 megohm, ½ watt (R6, R10, R23)
38803	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
33514	Socket—Phone input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
12007	Spring—Retaining spring for first I.F. and second I.F. transformers' core and stud and for oscillator's core, coil, and stud
38809	Switch—Radio-phono switch (S5, S6)
38807	Switch—Range switch (S1, S2, S3, S4)
35636	Transformer—First I.F. transformer (L9, L10, C17, C18)
35790	Transformer—Second I.F. transformer (L11, L12, C25, C28)
34539	Transformer—Power transformer 105-115 volts 50-60 cycles (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES **92513-1K**
70574	Cone—Cone and voice coil assembly
31539	Plug—Five (5) prong male plug for speaker
70548	Speaker—12" EM speaker complete with cone and voice coil less output transformer and plugs
37899	Transformer—Output transformer (T2)
	92567-1 (RL-70M2)
13867	Cap—Dust cap
11469	Coil—Neutralizing coil
36331	Coil—Field Coil—1630 ohms
36145	Cone—Cone complete with voice coil
31539	Plug—Five prong male plug for speaker
70548	Speaker—Speaker complete less output trans & plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36327	Bezel—Dial bezel less dial scale
38376	Bezel—P.B. bezel less push buttons
36639	Bracket—Pilot lamp bracket
38375	Button—Push button
70556	Bumper—Rubber bumper for record changer tray (2 req'd)
38684	Capacitor—Trimmer, 2-20 mmf. (C3)
36424	Capacitor—Mica trimmer, comprising one (1) section of 10-160 mmf.; two (2) sections of 25-250 mmf.; two (2) sections of 50-400 mmf.; and one (1) section of 100-540 mmf. (C44, C45, C46, C47, C48, C49)
36462	Clamp—Dial clamp
31382	Clip—Mounting clip for P.B. coils
38579	Coil—Loop primary coil (L2)
38315	Coil—P.B. oscillator coil—high frequency (L14, L15, L16)
37638	Coil—P.B. oscillator coil—low frequency (L17, L18, L19)
38405	Control—H.F. tone control (R16)
38402	Control—L.F. tone control and power switch (R22, S-8)
35871	Core—Adjustable core and stud for P.B. oscillator coils
70550	Cushion—Sock absorbing cushion
39015	Decal—Control panel decal
37147	Decal—H.F. tone control decal
37148	Decal—L.F. tone control decal
35392	Decal—Trade mark decal (RCA Victor)
70575	Decal—Trade mark decal (Dog)
39014	Dial—Glass dial scale
X1607	Grille—Grille cloth for Mahogany cabinet
70996	Grille—Metal grille
X1608	Grille—Grille cloth for Walnut cabinet
39368	Guide—Carriage guide—L.H.
39367	Guide—Carriage guide—R.H.
39352	Hinge—Cabinet door hinge
13103	Jewel—Pilot lamp cap
70995	Knob—Record storage compartment door knob
35814	Knob—Tone control, radio-phono switch, range switch, tuning knob, or volume control
11765	Lamp—Dial lamp
70544	Loop—Antenna loop (L1, L2, C3)
34317	Marker—Station marker
70546	Mounting—One set of hardware to mount record changer consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts
30868	Plug—Two (2) contact female plug for motor cable extension
30870	Plug—Two (2) prong male plug for motor cable extension
36422	Plug—Three (3) contact female plug for selector cable and loop leads
31572	Plug—Three (3) contact female plug for power switch cable
38853	Plug—Four (4) contact female plug for tone control cable
70994	Pull—Record changer compartment door pull
70551	Retainer—Tray roller retaining strip—L.H.
70552	Retainer—Tray roller retaining strip—R.H.
70554	Roller—Record changer tray roller
30900	Spring—Retaining spring for control knob
34053	Spring—Retaining spring for push button
70549	Stop—Mechanism tray stop
38575	Switch—Selector switch (S14, S15, S16, S17, S18, S19, S44, S45, S46, S47, S48, S49)
39360	Support—Door support for record changer compartment
70545	Support—Loop support complete with mounting brackets and spring
70555	Tire—Rubber tire for tray roller
70553	Tray—Record changer carrying tray less rollers
2917	Washer—Spring washer to hold roller

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model QU61

RCA MODEL QU61

VICTROLA

Radio-Phonograph Combination
Chassis No. RC-568B—Mfr. No. 274

Service Data

1946 • • • • X1

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

REFER TO SERVICE DATA 960001 FOR INFORMATION ON RECORD CHANGER

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (199-133 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SK7	R-F Amplifier
(2) RCA-6SA7	1st Detector-Oscillator
(3) RCA-6SK7	I-F Amplifier
(4) RCA-6SQ7	2nd Det. A-F Amplifier A.V.C.
(5) RCA-6AD7G	Phase Inverter and Power Output
(6) RCA-6F6G	Power Output
(7) RCA-6U5/6G5	Tuning Indicator
(8) RCA-5U4G	Rectifier
Pilot Lamps	2—Type 44, 6.3 volts, 0.25 amps.

Power Output

Undistorted	9.5 watts
Maximum	11 watts

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating D	(See below)	60†	130

110 position—100 min.—115 max.
125 position—115 min.—135 max.
150 positio. —135 min.—165 max.
210 position—190 min.—230 max.
240 position—220 min.—260 max.

Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

CAUTION: Remove power cord from line receptacle before changing link position.

†This instrument may be operated from 50 cycle power supply if the record changer is modified—refer to 960001 Service Data.

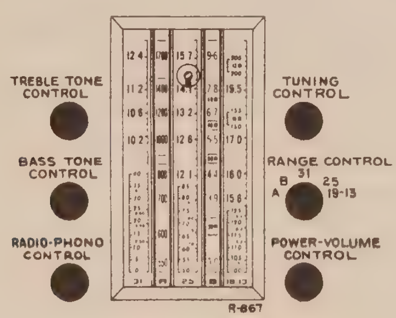
Loudspeakers—12-inch

Type	One Electromagnetic and One Permanent Magnet
Identification Numbers	92516-2 and 92520-1
V.C. Impedance	2.2 ohms at 400 cycles

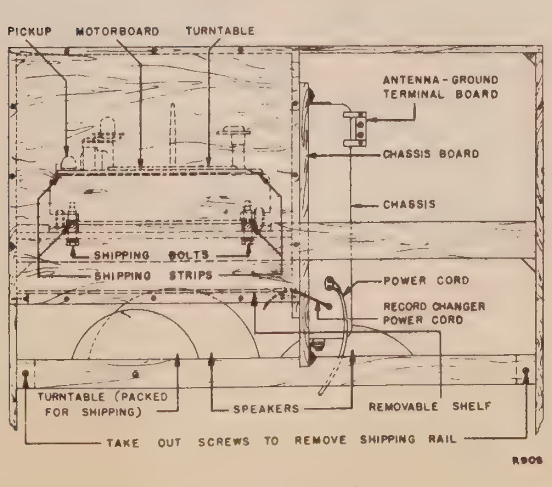
	Height	Width	Depth
Cabinet Dimensions (inches)	35⅜	17⅞	34⅞
Overall Chassis Dimensions (inches)	7	19	10½

Weight .... 104 lbs(net) 186 lbs. (shipping)

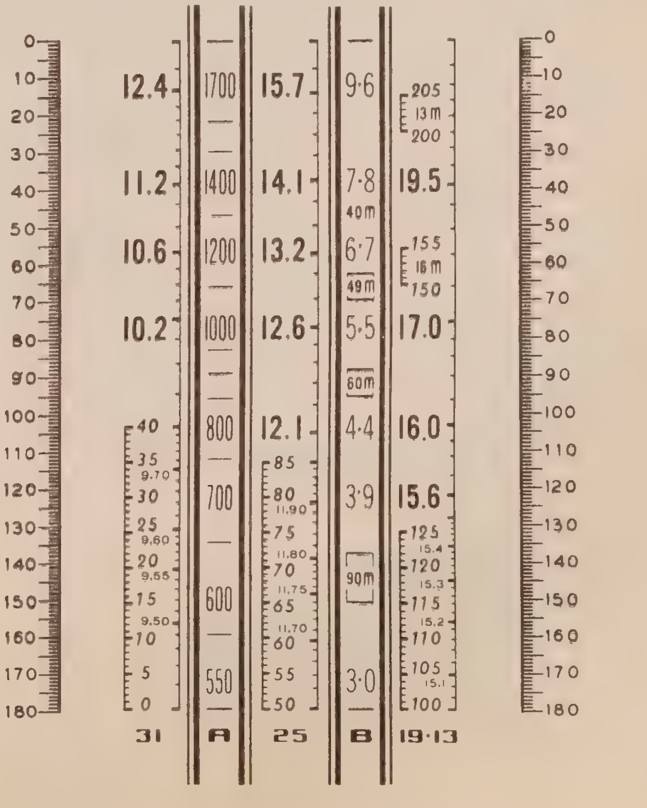
Tuning Drive Ratio .... 10 to 1


TREBLE TONE CONTROL
BASS TONE CONTROL
RADIO-PHONO CONTROL
TUNING CONTROL
RANGE CONTROL
B 31 25
A 19-13
POWER-VOLUME CONTROL
R-867

Location of Controls


PICKUP
MOTORBOARD
TURNTABLE
ANTENNA-GROUND TERMINAL BOARD
CHASSIS BOARD
CHASSIS
SHIPPING BOLTS
SHIPPING STRIPS
POWER CORD
RECORD CHANGER POWER CORD
TURNTABLE (PACKED FOR SHIPPING)
SPEAKERS
REMOVABLE SHELF
TAKE OUT SCREWS TO REMOVE SHIPPING RAIL
R908

Cabinet Rear View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170
180
12.4
11.2
10.6
10.2
1700
1400
1200
1000
800
700
600
550
15.7
14.1
13.2
12.6
12.1
9·6
7·8
40m
6·7
49m
5·5
60m
4·4
3·9
90m
3·0
205
13m
200
19.5
155
16m
150
17.0
16.0
15.6
31
A
25
B
19·13

Receiver Dial with Calibration Scale

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic circuit diagram.

Output Meter Alignment.—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

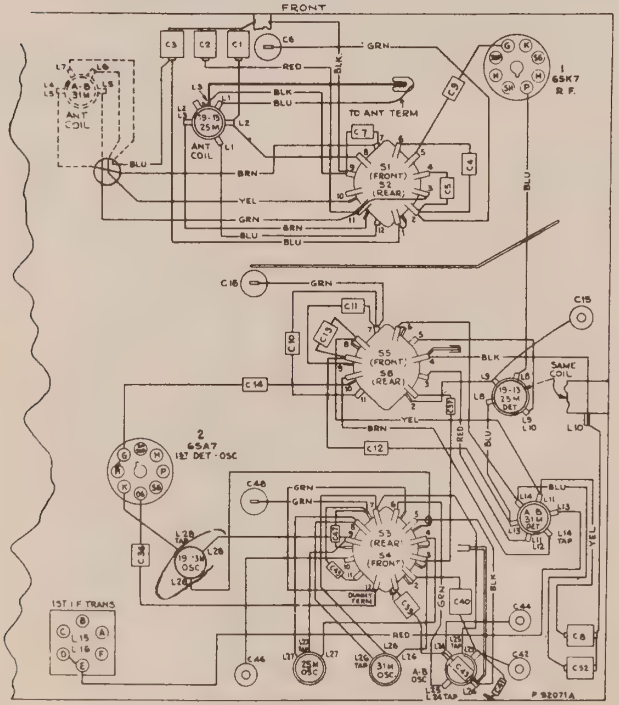
Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scale, refer to the drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread band ranges is on actual reception of short-wave stations of known frequency, by retouching the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

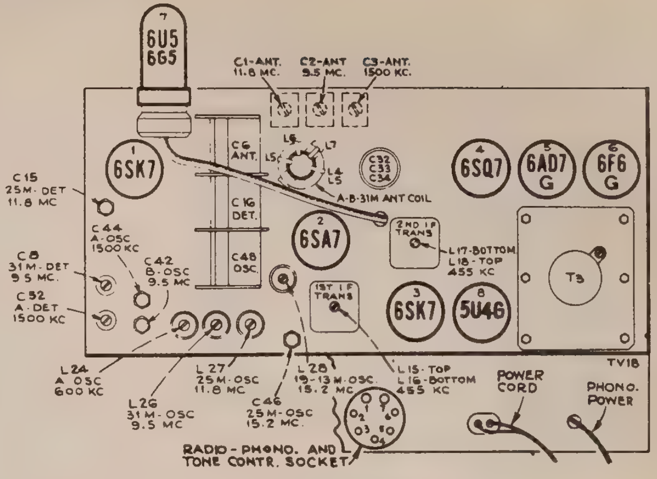
REFER TO SERVICE DATA 960001-3 FOR INFORMATION ON RECORD CHANGER


FRONT
C3
C2
C1
C6
GRN
RED
BLK
BLU
TO ANT TERM
C7
ANT COIL
BRN
YEL
S1 (FRONT)
S2 (REAR)
1
6SK7
R.F.
C18
C11
C15
S5 (FRONT)
S6 (REAR)
SAME COIL
C14
C12
2
6SA7
1ST DET-OSC
C48
S3 (REAR)
S4 (FRONT)
1ST I.F. TRANS
C40
C44
C42
C46
C8
C52
P 92071A

R. F. Wiring Diagram (Bottom View)

Circuit Modifications

In some sets, a modification has been made in the "Radio-Phono Switch and Tone Control Strip." In these sets, R9 (Stock No. 30648) has been omitted and C57—120 mmf.—Stock No. 39630 has been changed to 47 mmf.—Stock No. 35644. A 220,000 ohm resistor (R33, Stock No. 14583) has been added from terminal 12 of S7 to the ground terminal of R11.


7
6U5
6G5
C1-ANT. 11.8 MC.
C2-ANT 9.5 MC.
C3-ANT. 1500 KC.
1
6SK7
C6 ANT.
L6
L7
L5
L4
L5
C32 C33 C34
4
6SQ7
5
6AD7 G
6
6F6 G
C15 25M-DET 11.8 MC
C16 DET.
A-B-31M ANT COIL
C44 A-OSC 1500 KC
2
6SA7
2ND I F TRANS
L17-BOTTOM L18-TOP 455 KC
C8 31M-DET 9.5 MC.
C42 B-OSC 9.5 MC
C48 OSC.
T3
C52 A-DET 1500 KC
1ST I F TRANS
3
6SK7
8
5U4G
L24 A OSC 600 KC
L27 25M-OSC 11.8 MC
L28 19-13 M-OSC. 15.2 MC
L15-TOP L16-BOTTOM 455 KC
TV18
POWER CORD
PHONO. POWER
L26 31M-OSC 9.5 MC
C46 25M-OSC 15.2 MC.
RADIO-PHONO. AND TONE CONTR. SOCKET

Tube and Trimmer Locations

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L18-L17 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L16-L15 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (138.5°)	L27 (osc.)** C1 (ant.) C15 (det.)***
4		15.2 mc		15.2 mc (18.5°)	C46 (osc.)*† Rock in
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (156°)	L28 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (156°)	L26 (osc.)** C2 (ant.) C8 (det.)***
8		9.5 mc	"B" band	9.5 mc (11.5°)	C42 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (27°)	C44 (osc.) C3 (ant.) C52 (det.)
10		600 kc		600 kc (149.5°)	L24 (osc.) Rock in
11	Repeat steps 9 and 10.				

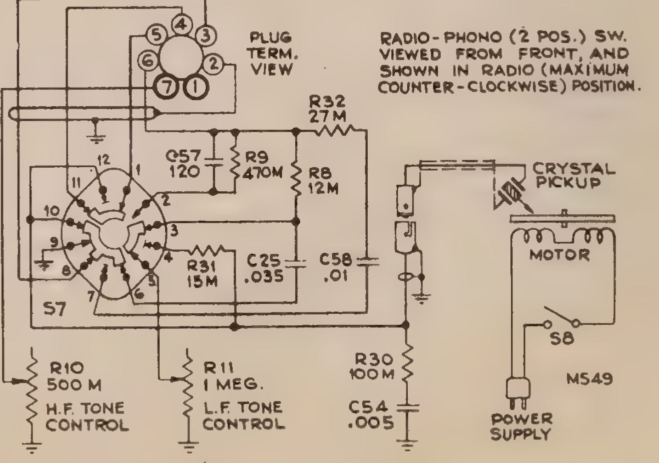
* Use minimum capacity peak if two can be obtained.

** If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

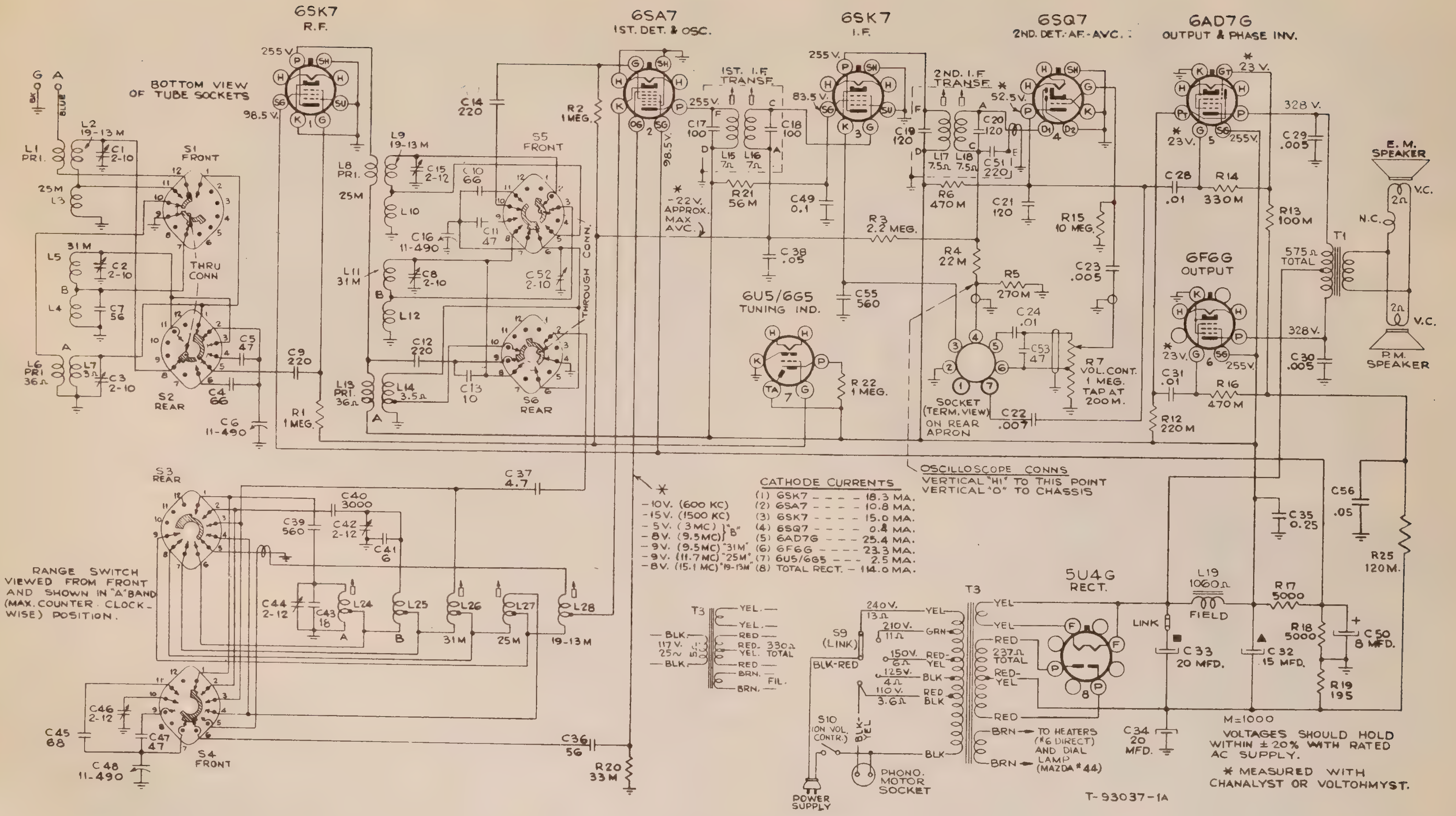
*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C46 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signals on all bands.


PLUG TERM. VIEW
RADIO-PHONO (2 POS.) SW. VIEWED FROM FRONT, AND SHOWN IN RADIO (MAXIMUM COUNTER-CLOCKWISE) POSITION.
1
2
3
4
5
6
7
R32 27M
C57 120
R9 470M
R8 12M
CRYSTAL PICKUP
12
11
10
9
8
7
6
5
4
3
2
1
MOTOR
R31 15M
C25 .035
C58 .01
S7
S8
R10 500 M
H.F. TONE CONTROL
R11 1 MEG.
L.F. TONE CONTROL
R30 100 M
C54 .005
M549
POWER SUPPLY

Radio-Phono. Switch and Tone Control Strip


6SK7
R.F.
6SA7
1ST. DET. & OSC.
6SK7
I.F.
6SQ7
2ND. DET.-AF.-AVC.
6AD7G
OUTPUT & PHASE INV.
6F6G
OUTPUT
6U5/6G5
TUNING IND.
5U4G
RECT.
BOTTOM VIEW
OF TUBE SOCKETS
1ST. I.F. TRANSF.
2ND. I.F. TRANSF.
E. M. SPEAKER
P.M. SPEAKER
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCK-WISE) POSITION.
SOCKET (TERM. VIEW) ON REAR APRON
OSCILLOSCOPE CONNS
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS
CATHODE CURRENTS
(1) 6SK7 ---- 18.3 MA.
(2) 6SA7 ---- 10.8 MA.
(3) 6SK7 ---- 15.0 MA.
(4) 6SQ7 ---- 0.4 MA.
(5) 6AD7G --- 25.4 MA.
(6) 6F6G ---- 23.3 MA.
(7) 6U5/6G5 --- 2.5 MA.
(8) TOTAL RECT. - 114.0 MA.
-10V. (600 KC)
-15V. (1500 KC)
-5V. (3 MC)
-8V. (9.5MC) "B"
-9V. (9.5MC) "31M"
-9V. (11.7MC) "25M"
-8V. (15.1 MC) "19-13M"
-22V. APPROX. MAX AVC.
TO HEATERS (*6 DIRECT) AND DIAL LAMP (MAZDA #44)
PHONO. MOTOR SOCKET
POWER SUPPLY
S10 (ON VOL. CONTR.)
S9 (LINK)
M=1000
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED AC SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
T-93037-1A

Schematic Circuit Diagram

Precautionary Lead Dress.—

(1) Dress all spread band oscillator coil leads to clear each other by at least ¼ inch.

(2) Dress toothpick capacitors and range switch leads away from shield plates.

(3) Twist leads from A and E of 2nd I-F transformer and dress close to chassis.

(4) Dress leads to converter socket so that they do not impair flexible mounting.

(5) Dress oscillator grid capacitor C36 and 1st det. grid capacitor C14 apart.

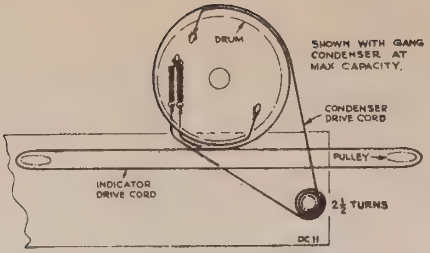
(6) Dress capacitor C23 away from front apron; dress capacitor C24 as close to rear apron as possible.

(7) Dress twisted a-c wiring to power switch away from volume control wiring and components.

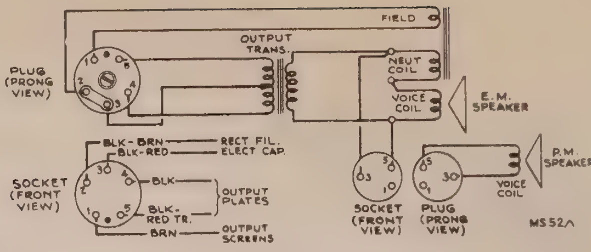
(8) Dress excess power transformer leads between transformer bell and back apron.

NOTE:
R-25 and C-56 are omitted in early production.

Replacement Parts



Dial-Indicator and Drive Mechanism

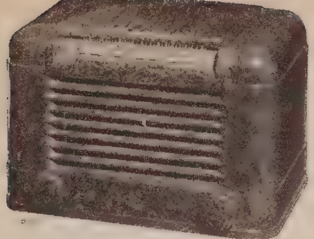


Loudspeaker Connections

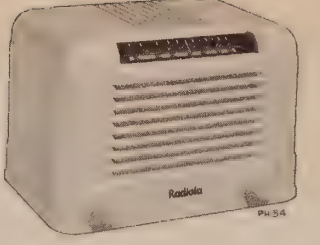
REFER TO SERVICE DATA 960001 FOR INFORMATION ON RECORD CHANGER

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-568B
37053	Board—"Antenna-Ground" board
37994	Bracket—Bracket (long) complete with drive cord pulley
37995	Bracket—Bracket (short) complete with drive cord pulley
35642	Calibrator—Drive drum calibrator
37996	Capacitor—Mica trimmer, dual, 2.5-10 mmf. (C8, C52)
37059	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
12714	Capacitor—Air trimmer, 2-12 mmf. (C15, C42, C44, C46)
33097	Capacitor—Ceramic, 4.7 mmf. (C37)
35646	Capacitor—Ceramic, 6 mmf. (C41)
39604	Capacitor—Mica, 10 mmf. (C13)
39041	Capacitor—Ceramic, 18 mmf. (C43)
70582	Capacitor—Ceramic, 47 mmf. (C5, C11)
39620	Capacitor—Mica, 47 mmf. (C53)
35644	Capacitor—Ceramic, 47 mmf. (C47)
39622	Capacitor—Mica, 56 mmf. (C7, C36)
71291	Capacitor—Mica, 68 mmf. (C4, C10)
35645	Capacitor—Ceramic, 68 mmf. (C45)
39628	Capacitor—Mica, 100 mmf. (C17, C18)
39630	Capacitor—Mica, 120 mmf. (C19, C20, C21)
39636	Capacitor—Mica, 220 mmf. (C9, C12, C14, C51)
70667	Capacitor—Mica, 560 mmf. (C39)
39646	Capacitor—Mica, 560 mmf. (C55)
70687	Capacitor—Mica, 3,000 mmf. (C40)
71007	Capacitor—Tubular, .005 mfd., 1,600 volts (C29, C30)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C23)
70629	Capacitor—Tubular, .007 mfd., 600 volts (C22)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C24)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C28, C31)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C38)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C49)
70639	Capacitor—Tubular, 0.25 mfd., 600 volts (C35)
32187	Capacitor—Electrolytic, 8 mfd., 150 volts (C50)
37888	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 1 section of 15 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C33, C32, C34) (See Note)
37055	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7)
37056	Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3)
37093	Coil—Oscillator coil, "A", "B" bands (L24, L25)
35624	Coil—Oscillator coil, 19-13 meter band (L28)
35625	Coil—Oscillator coil, 25 meter band (L27)
35626	Coil—Oscillator coil, 31 meter band (L26)
37058	Coil—R-F coil, 25 meter and 19-13 meter bands (L8, L9, L10)
37057	Coil—R-F coil, "A", "B" and 31 meter bands (L11, L12, L13, L14)
37992	Control—Volume control and power switch (R7, S10)
37151	Condenser—Variable tuning condenser (C6, C16, C48)
32634	Cord—Drive cord (approx. 24" overall length)
12006	Core—Adjustable core and stud for I-F transformers
32634	Cord—Indicator cord (approx. 41" overall length)
31259	Core—Adjustable core and stud for 25 meter and 31 meter band oscillator coils and for 19-13 meter band osc. coil
35788	Core—Adjustable core and stud for ABC band oscillator coil
35768	Drum—Drive drum less calibrator
28452	Plate—Bakelite mounting plate for capacitor #37888
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
39858	Pulley—Drive cord pulley
34189	Resistor—Voltage divider, consisting of 1 section of 5,000 ohms, 8 watt; 1 section of 5,000 ohms, 2.5 watt; and 1 section of 195 ohms, 3 watt (R17, R18, R19)
30492	Resistor, 22,000 ohms, ¼ watt (R4)
30685	Resistor—33,000 ohms, ¼ watt (R20)
30650	Resistor—56,000 ohms, ½ watt (R21)
3252	Resistor—100,000 ohms, ¼ watt (R13)
14583	Resistor—220,000 ohms, ½ watt (R12)
30651	Resistor—270,000 ohms, ¼ watt (R5)
14983	Resistor—330,000 ohms, ¼ watt (R14)
30648	Resistor—470,000 ohms, ½ watt (R6, R16)
30652	Resistor—1 megohm, ¼ watt (R1, R2, R22)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R15)
14350	Screw—#8-32 square head set screw for drive drum
38842	Shaft—Tuning knob shaft and flywheel
36107	Socket—7 contact socket located on rear apron of chassis
31364	Socket—Dial lamp socket
31251	Socket—Tube socket
34864	Socket—Tuning tube socket
31261	Spring—Retaining spring for 19-13 meter band oscillator coil core and stud and for oscillator coils' core and stud assemblies
31418	Spring—Drive or indicator cord spring
12007	Spring—Retaining spring for I-F transformers core and stud assemblies

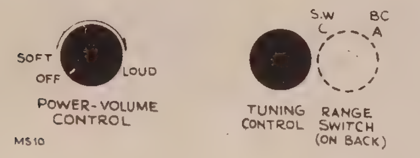
STOCK No.	DESCRIPTION
37993	Switch—Range switch (S1, S2, S3, S4, S5, S6)
35636	Transformer—First I-F transformer (L15, L16, C17, C18)
36615	Transformer—Second I-F transformer (L17, L18, C19, C20, C51)
34183	Transformer—Power transformer, 110/125/150/210/240 volts, 50-60 cycle (T3)
39786	Transformer—Power transformer, 105/120 volts, 25-60 cycle (T3)
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92520-1K
70574	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
70686	Speaker—12" PM speaker complete with cone and voice coil less plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	SPEAKER ASSEMBLIES 92516-2K
70574	Cone—Cone and voice coil assembly
5119	Plug—3 contact female plug for speaker
31539	Plug—5 prong male plug for speaker
70573	Speaker—12" E.M. speaker complete with cone and voice coil less output transformer and plugs
70688	Transformer—Output transformer (T1)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
X1601	Baffle—Baffle board and grille cloth
4287	Body—Phono-input cable connector body
36639	Bracket—Lamp bracket
70556	Bumper—Rubber bumper for tray
39630	Capacitor—Mica, 120 mmf. (C57)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C54)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C58)
70614	Capacitor—Tubular, .035 mfd., 200 volts (C25)
30716	Clip—Tuning tube clip
36109	Control—L.F. tone control (R11)
35629	Control—H.F. tone control (R10)
70694	Cushion—Rubber cushion
36156	Decal—HF. tone control decal
36155	Decal—L.F. tone control decal
36074	Decal—Radio-phono switch decal
37839	Decal—Range switch decal
70669	Decal—Trade mark decal
35387	Decal—Volume control and power switch decal
39923	Dial—Glass dial scale
4286	Ferrule—Phono-input cable ferrule and bushing
37998	Frame—Dial frame assembly less tube clip, indicator and dial
70691	Guide—Guide rail—L.H.
70692	Guide—Guide rail—R.H.
70690	Hinge—L.H. cabinet door hinge
70693	Hinge—R.H. cabinet door hinge
36593	Indicator—Station selector indicator
13103	Jewel—Pilot lamp cap
36038	Knob—Radio-phono or range switch knob
35814	Knob—Volume control, tone control or tuning knob
11891	Lamp—Dial lamp
70546	Mounting—One set of record changer mounting hardware consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts.
30868	Plug—2 contact female plug for motor cable extension
30870	Plug—2 prong male plug for motor cable extension
36395	Plug—7 prong male plug for radio-phono cable
30436	Resistor—12,000 ohms, ¼ watt (R8)
36714	Resistor—15,000 ohms, ¼ watt (R31)
30409	Resistor—27,000 ohms, ¼ watt (R32)
3252	Resistor—100,000 ohms, ¼ watt (R30)
30648	Resistor—470,000 ohms, ¼ watt (R9)
71151	Retainer—Tray roller retaining strip
71152	Retainer—Tray roller retaining strip
70554	Roller—Changer tray roller
4284	Spring—Phono-input cable connector spring
30900	Spring—Retaining spring for knob
70689	Stop—Mechanism tray stop
39360	Support—Drop support for record changer compartment door
39875	Switch—Radio-phono switch (S7)
70555	Tire—Rubber tire for tray roller
70553	Tray—Record changer carrying tray less rollers
4285	Washer—Phono-input cable insulating washer
2917	Washer—Retaining washer for tray roller
NOTE:	#37888 rating is 20-20-20 mfd., 450-450-25 volts.



61-6 (Walnut)



61-7 (Ivory)



Location of Controls

Radiola

61-6 and 61-7

Chassis No. RC-594D

SERVICE DATA

1946 . . . R2

RADIO CORPORATION OF AMERICA
HOME INSTRUMENT DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Ranges

Standard Broadcast ("A" Band) .... 540-1,680 kc (555-178 m)
Short Wave ("C" Band) .... 4.7-18.2 mc (63.8-16.5 m)

Intermediate Frequency .... 455 kc

RCA Tube Complement

(1) RCA Radiotron-12SA7 .... 1st Detector-Oscillator
(2) RCA Radiotron-12SK7 .... I-F Amplifier
(3) RCA Radiotron-12SQ7 .... 2nd Detector, A.V.C., and A-F Amplifier
(4) RCA Radiotron-50L6GT .... Power Output
(5) RCA Radiotron-35Z5GT/G .... Rectifier

Power Supply Rating

105-125 volts .... D.C. or 50-60 cycles A.C. .... 30 watts

Power Output Rating

Undistorted .... 1 watt
Maximum .... 1.5 watts

Loudspeaker (92510-2)

Type .... 5-inch Round Permanent-Magnet Dynamic
Voice Coil Impedance .... 4 ohms at 400 cycles

Tuning Drive Ratio .... 18 to 1

Dimensions (Inches)	**Width**	**Height**	**Depth**
Cabinets (Outside)	10 3/16	6 11/16	6 1/16
Chassis Base (Outside)	9 5/8	1 9/16	4 3/4
Chassis Overall	9 5/8	6 1/8	7

Weight Net .... 6 lbs. **Weight Shipping** .... 7½ lbs.

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.
5. Keep body of C1A slightly away from chassis.

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Replacement Parts

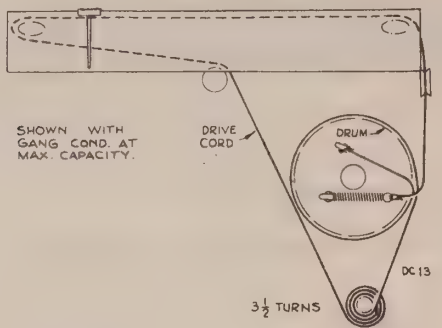
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-594D
71387	Capacitor—Adjustable, 1.6-18 mmf. (C37)
70367	Capacitor—Mica trimmer, 2-10 mmf. (C7)
39622	Capacitor—Mica, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C1A, C17)
71392	Capacitor—Mica, 450 mmf. (C5B)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C1, C16, C18)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10, C20)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11)
39152	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C30, C30A)
71396	Coil—Antenna coil (L1, L2)
37962	Coil—Antenna loop coupling coil (L3, L5, R20)
70359	Coil—Oscillator coil (L6, L7)
70366	Condenser—Variable tuning condenser (C2, C3, C5, C6)
38406	Control—Volume control and power switch (R4, S2)
32634	Cord—Drive cord (approx. 37 inches long)
70392	Cord—Power cord
70365	Core—Adjustable core and stud for oscillator coil
16058	Grommet—Rubber grommet for mounting speaker—3 required
37068	Indicator—Station selector indicator
71397	Loop—Antenna loop (L4)
70364	Nut—Speed nut to mount oscillator coil
70368	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
30880	Resistor—150 ohms, ½ watt (R7)
30152	Resistor—1000 ohms, 1 watt (R9)
30685	Resistor—33,000 ohms, ¼ watt (R1A)
30787	Resistor—47,000 ohms, ¼ watt (R3)
14583	Resistor—220,000 ohms, ¼ watt (R19)
30648	Resistor—470,000 ohms, ¼ watt (R8)
30649	Resistor—2.2 megohms, ¼ watt (R1)
12928	Resistor—3.3 megohms, ¼ watt (R2)
30992	Resistor—10 megohms, ¼ watt (R6)
70369	Shaft—Tuning knob shaft
37605	Socket—Tube socket, moulded
31418	Spring—Tension spring for drive cord
71384	Switch—Range switch (S1)
70361	Transformer—First I-F transformer (L8, L9, C8, C9)
70362	Transformer—Second I-F transformer (L10, L11, C12, C13, C14, C15)
71398	Transformer—Output transformer (T1)
33726	Washer—Retaining washer for tuning shaft
	SPEAKER ASSEMBLY 92510-2
70372	Speaker—5-inch PM speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
37362	Clamp—Dial clamp (1 set)
71324	Decal—Trade mark decalcomania
71389	Dial—Dial scale
37831	Fastener—Push fastener for back cover (1 set)
35121	Knob—Range switch knob for Radiola 61-6
35123	Knob—Range switch knob for Radiola 61-7
36722	Knob—Volume control or tuning knob for Radiola 61-6
70414	Knob—Tuning or volume control knob for Radiola 61-7
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

APPLY TO YOUR RADIOLA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for easy reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

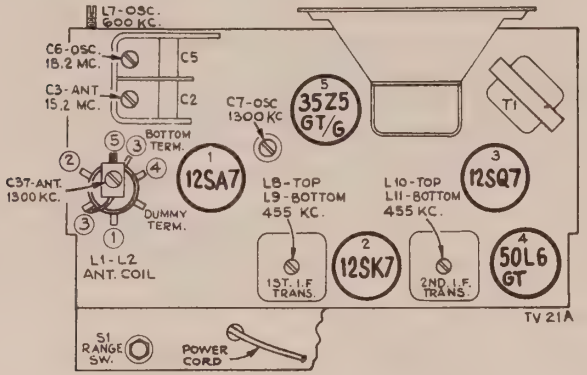
Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand mark of the Standard Broadcast scale.


SHOWN WITH GANG COND. AT MAX. CAPACITY.
DRIVE CORD
DRUM
DC 13
3½ TURNS

Dial Indicator and Drive Mechanism

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.


L7-OSC. 600 KC.
C6-OSC. 18.2 MC.
C5
C3-ANT. 15.2 MC.
C2
C7-OSC 1300 KC
35Z5 GT/G
T1
BOTTOM TERM.
C37-ANT. 1300 KC.
12SA7
DUMMY TERM.
L1-L2 ANT. COIL
L8-TOP L9-BOTTOM 455 KC.
L10-TOP L11-BOTTOM 455 KC.
12SQ7
12SK7
50L6 GT
1ST. I.F TRANS.
2ND. I.F. TRANS.
TV 21A
S1 RANGE SW.
POWER CORD

Tube and Trimmer Locations

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator through a .01 mfd. capacitor to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

For additional information refer to booklet "RCA Victor Receiver Alignment."

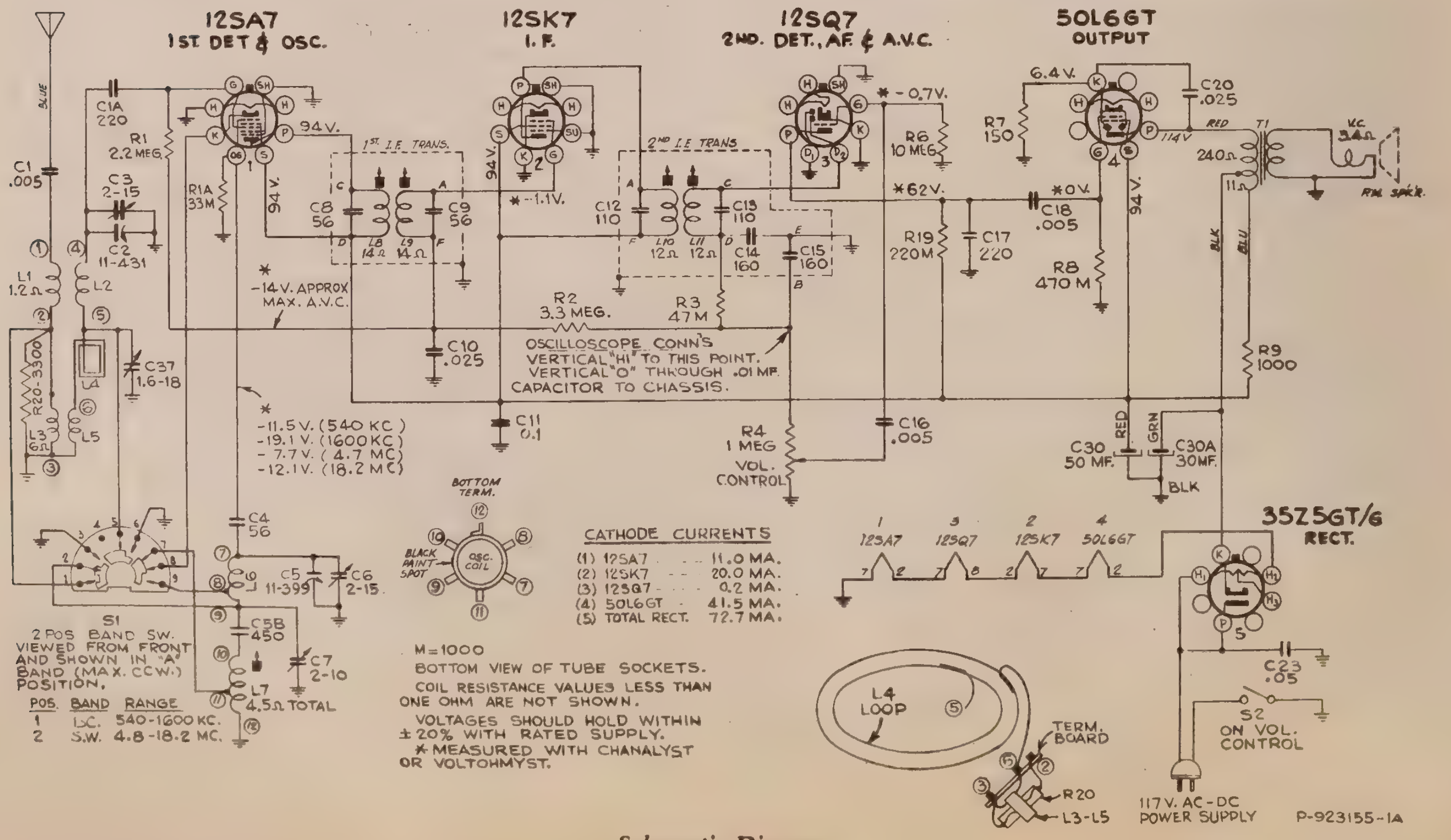
Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. output—
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	B. C.; 1600 kc quiet point	L11-L10 (2nd I-F Trans.)
2	Stator of gang cond. C2 (rear) through 0.1 mfd.			L9-L8* (1st I-F Trans.)
3	Antenna lead through 300 ohm resistor	18.2 mc	S. W.; gang condenser open	C6 (osc.)**
4		15.2 mc	S. W.; maximum signal rock gang	C3 (ant.)***
5	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; 600 kc	L7 (osc.)
6		1300 kc	B. C.; rock gang at 1300 kc	C37 (ant.) C7 (osc.)
7		600 kc	B. C.; rock gang at 600 kc	L7 (osc.)
8	Repeat steps 6 and 7			

* Do not readjust L10 or L11 when test oscillator is connected to C2.

** Use minimum capacity peak if two peaks can be obtained.

*** Image signal of lesser amplitude should occur at 14.3 mc.

NOTE.—Oscillator tracks above signals on both bands.


12SA7
1ST DET & OSC.
12SK7
I. F.
12SQ7
2ND. DET., AF. & A.V.C.
50L6GT
OUTPUT
BLUE
C1A 220
R1 2.2 MEG.
94 V.
C1 .005
C3 2-15
C2 11-431
R1A 33M
1ST I.F. TRANS.
C8 56
L8 14Ω
L9 14Ω
C9 56
*-1.1V.
2ND I.F. TRANS.
C12 110
L10 12Ω
L11 12Ω
C13 110
C14 160
C15 160
*-0.7V.
R6 10 MEG.
*62V.
R19 220M
C17 220
R7 150
6.4 V.
C20 .025
114 V
RED
T1
V.C. 3.4Ω
240Ω
11Ω
PM. SPKR.
*0V.
C18 .005
R8 470 M
BLK
BLU
L1 1.2Ω
L2
*
-14 V. APPROX MAX. A.V.C.
R2 3.3 MEG.
R3 47 M
C10 .025
OSCILLOSCOPE CONN'S VERTICAL "HI" TO THIS POINT. VERTICAL "O" THROUGH .01 MF. CAPACITOR TO CHASSIS.
C37 1.6-18
R20-3300
L3 6Ω
L4
L5
*
-11.5 V. (540 KC)
-19.1 V. (1600 KC)
- 7.7 V. (4.7 MC)
-12.1 V. (18.2 MC)
C11 0.1
R4 1 MEG VOL. CONTROL
C16 .005
R9 1000
C30 50 MF.
C30A 30MF.
RED
GRN
BLK
C4 56
C5 11-399
C6 2-15
C5B 450
C7 2-10
L7 4.5Ω TOTAL
BOTTOM TERM.
BLACK PAINT SPOT
OSC. COIL
S1
2 POS BAND SW. VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. CCW.) POSITION.
12SA7
12SQ7
12SK7
50L6GT
35Z5GT/G
RECT.
C23 .05
S2 ON VOL. CONTROL
L4 LOOP
TERM. BOARD
R20
L3-L5
117 V. AC-DC POWER SUPPLY
P-923155-1A

POS.	BAND	RANGE
1	B.C.	540-1600 KC.
2	S.W.	4.8-18.2 MC.

CATHODE CURRENTS

(1) 12SA7		11.0 MA.
(2) 12SK7		20.0 MA.
(3) 12SQ7		0.2 MA.
(4) 50L6GT		41.5 MA.
(5) TOTAL RECT.		72.7 MA.

M=1000

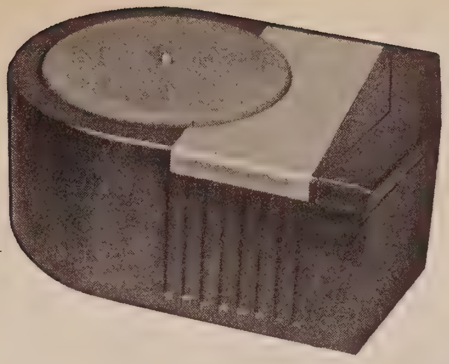
BOTTOM VIEW OF TUBE SOCKETS.

COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

Schematic Diagram



63E, 63EM

RCA VICTOR

VICTROLA

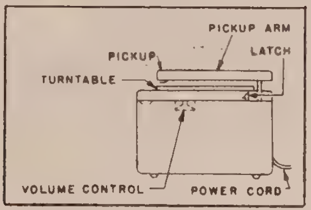
Model 63E, 63EM

Chassis No. RS-127 Mfr. No. 274

SERVICE DATA

1946..No. 18

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



Side View

Electrical Specifications

Power Supply

115 volts, 60 cycle..45 watts

IMPORTANT—Do not plug chassis into a d.c. power supply.

Power Output Rating

Undistorted..1.1 watts (approx.)

Maximum..1.3 watts (approx.)

Tube Complement

(1) RCA 35Z5GT/G..Rectifier

(2) RCA 50L6GT..Power Amplifier

(3) RCA 12SQ7..Audio Amplifier

Phonograph

Motor..Self-starting, Induction

Drive..Rim drive, 78 R.P.M.

Pickup................Crystal (Low noise, High voltage, sapphire point)

Loudspeaker

Type 92572-1......................5 inch Permanent Magnet Dynamic

Irregular Turntable Speed:

(1) Oil or grease on rubber tire of turntable drive wheel. Remove turntable and clean drive wheel tire, and inside edge of turntable with naphtha or carbon-tetrachloride.

(2) Insufficient tension in drive wheel tension spring.

(3) Lack of lubrication.

Replacement Parts

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
71994	Arm—Pickup arm shell only less pivot arm, cable and crystal
71995	Arm—Pivot arm and shaft
71996	Bracket—Bracket mounted on inside of pickup arm for hold down latch
71278	Cable—Pickup lead cable, twisted pair
70338	Crystal—Crystal cartridge complete
38452	Guard—Sapphire guard
70341	Nut—Nut and washer to mount sapphire and holder
71095	Nut—Speed nut to fasten cable in arm (located in center of arm)
38458	Nut—Speed nut to fasten cable in arm (located in rear of arm)
72345	Sapphire—Sapphire and holder
71997	Screw—Mounting screws to fasten pickup arm and pivot arm (1 set)
37763	Screw—#2-56 x ⅛″ screw to mount sapphire guard
	TURNTABLE AND MOTOR DRIVE ASSEMBLIES STAMPED 970464-1†
30870	Connector—2 prong male plug for motor cable
72780	Spindle—Turntable spindle for motor assembly stamped 970464-1
72779	Spring—Idler wheel tension spring for motor assembly stamped 970464-1
72777	Turntable—Finished turntable plate only for motor assembly stamped 970464-1
35969	Washer—"C" washer to fasten turntable for motor assembly stamped 970464-1
72778	Wheel—Idler wheel for motor assembly stamped 970464-1
	†Will be stamped on laminations.
	STAMPED 970470-1
30870	Connector—2 prong male plug for motor cable
72781	Motor—117 volts, 60 cycle motor complete with turntable and drive mechanism
39528	Spindle—Turntable spindle for motor assembly stamped 970470-1
72689	Spring—Conversion spring (60 to 50 cycle) for motor and turntable assembly #970470-1
39534	Spring—Idler wheel tension spring for motor stamped 970470-1
72782	Turntable—Finished turntable plate only for motor assembly stamped 970470-1
72688	Washer—"C" washer to fasten turntable for motor assembly stamped 970470-1
39529	Wheel—Idler wheel for motor assembly stamped 970470-1
	AMPLIFIER ASSEMBLY RS 127
70603	Capacitor—Tubular, .003 mfd., 400 volts (C2, C3)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C7)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C4)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C1)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C6)
72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C5A, C5B)
72000	Control—Volume control (R1)
70392	Cord—Power cord
30868	Plug—2 contact female plug for motor cable
72313	Resistor—33 ohms, 1 watt (R8)
72314	Resistor—120 ohms, 5 watts (R7)
30880	Resistor—150 ohms, ½ watt (R5)
30734	Resistor—5600 ohms, 1 watt (R6)
30651	Resistor—270,000 ohms, ½ watt (R3, R9)
30648	Resistor—470,000 ohms, ½ watt (R4)
30992	Resistor—10 megohms, ½ watt (R2)
31251	Socket—Tube socket
72009	Switch—Power switch
72535	Transformer—Output transformer (T1)
	SPEAKER ASSEMBLY 92572-1
72201	Speaker—5″ P.M. speaker complete with cone and voice coil less output transformer and plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72002	Bearing—Bearing and bracket to mount pickup and arm
71999	Bottom—Case bottom only less rubber feet
Y1378	Cabinet—Cabinet for Models 63E and 63EM
37831	Fastener—Push fastener for case bottom (1 set)
31051	Feet—Rubber feet (3 required)
71998	Knob—Volume control knob
72004	Latch—Pickup arm hold down latch
72008	Retainer—Pickup and arm assembly mounting retainer
30340	Retainer—Retainer for all pivot rods
72003	Rod—Pivot rod for bearing and bracket
72005	Rod—Pivot rod for hold down latch
72006	Rod—Pivot rod for main support
30900	Spring—Retaining spring for volume control knob
72542	Spring—Actuating spring for hold down support and latch assembly
72007	Spring—Hold down latch spring
72001	Stop—Rubber stop mounted on pivot arm bearing and bracket

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Lubrication

Motor

The bearings of the motors furnished in these instruments are lubricated at the factory and should require no further lubrication for a period of at least one year. When lubrication is required, apply a few drops of any good grade of S.A.E. #10 oil to the bearing felts.

Turntable Spindle

When lubrication is required, apply one or two drops of Gargoyle 600W to the bearing.

Drive Wheel

Apply one or two drops of any good grade of S.A.E. #10 oil to the bearing felt.

CAUTION: Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.

Service Hints

Service Hints

1. Failure to start when pickup is lifted.
    - a. Dirty switch contacts.
    - b. Weak or broken spring on pickup support arm.
    - c. Motor connector plug broken or dirty.

Motor Board Disassembly:

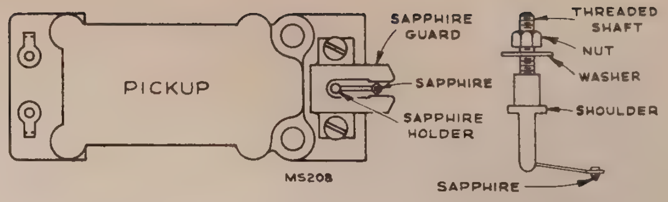
a. Remove the "C" washer on turntable spindle.
b. Lift turntable straight up.
c. Disconnect motor plug from power plug.
d. Remove two screws exposed on top of cabinet.

To remove turntable spindle disengage the spring clip from the bottom of the turntable spindle and lift up on the spindle.

To remove the motor from the motor mounting board, remove the three nuts from the top of the motor mounting board.

Disassembly of Pick-up Arm and Components:

a. Remove the switch by removing the two screws holding the switch assembly to the pickup assembly.
b. Remove the spring clips from the rear pivot of the support arm.
c. Remove the rear pivot rod.
d. Disengage the tone arm lift spring from the support arm.
e. Remove the spring clips from the front pivot of the support arm.
f. Remove the front pivot rod.
g. Remove the spring clip from the pick-up pivot arm.
h. Pick-up and bearing are free to be removed when the two leads from the crystal are removed.
i. Pick-up arm can be removed from bearing by loosening the two set screws at the side and bottom on the rear of the pick-up arm.


PICKUP
SAPPHIRE GUARD
SAPPHIRE
SAPPHIRE HOLDER
MS208
THREADED SHAFT
NUT
WASHER
SHOULDER
SAPPHIRE

Replacement of Sapphire

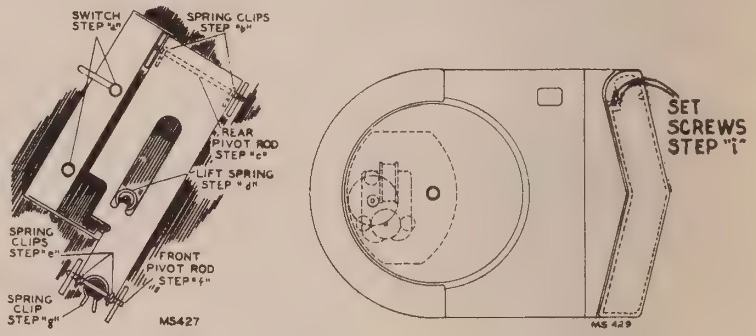
CAUTION: Never bend the sapphire support wire.

The nut on the sapphire holder assembly may be locked by a light cement. Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

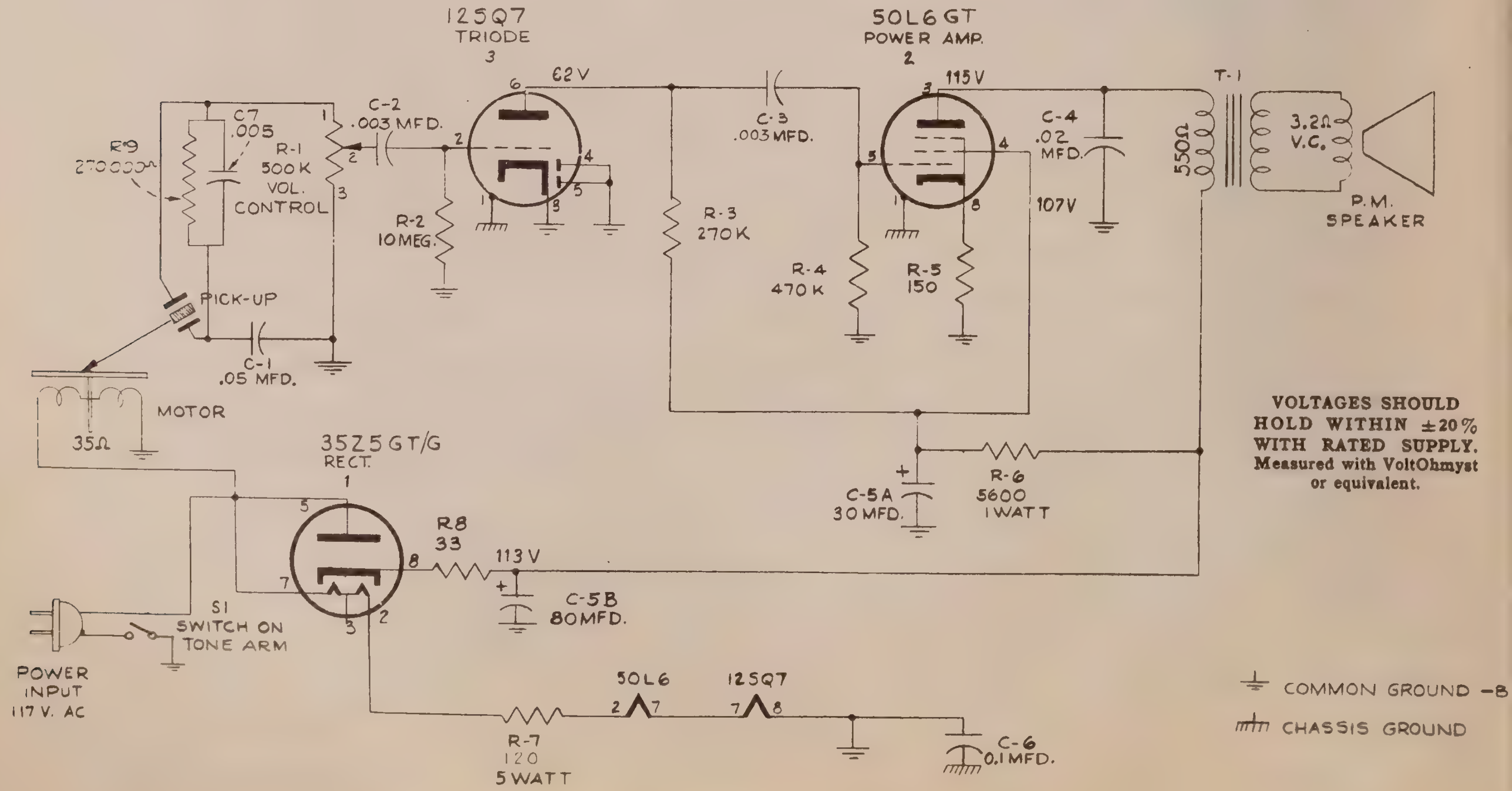
Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft if cement has been used. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020") beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

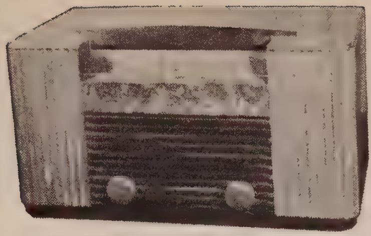

SWITCH STEP "a"
SPRING CLIPS STEP "b"
REAR PIVOT ROD STEP "c"
LIFT SPRING STEP "d"
SPRING CLIPS STEP "e"
FRONT PIVOT ROD STEP "f"
SPRING CLIP STEP "g"
MS427
SET SCREWS STEP "i"
MS 429

Disassembly Instructions

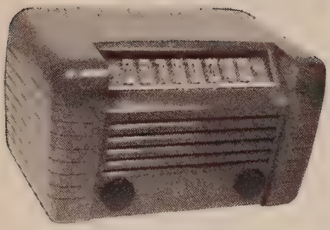

12SQ7
TRIODE
3
62V
C7
.005
R9
270000Ω
R-1
500K
VOL. CONTROL
C-2
.003 MFD.
R-2
10 MEG.
PICK-UP
C-1
.05 MFD.
MOTOR
35Ω
C-3
.003 MFD.
R-3
270K
50L6GT
POWER AMP.
2
115V
R-4
470K
R-5
150
C-4
.02 MFD.
107V
T-1
550Ω
3.2Ω V.C.
P.M. SPEAKER
35Z5GT/G
RECT.
1
R8
33
113V
C-5B
80 MFD.
C-5A
30 MFD.
R-6
5600
1 WATT
S1
SWITCH ON TONE ARM
POWER INPUT
117 V. AC
R-7
120
5 WATT
50L6
12SQ7
C-6
0.1 MFD.
COMMON GROUND -8
CHASSIS GROUND

VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.
Measured with VoltOhmyst or equivalent.

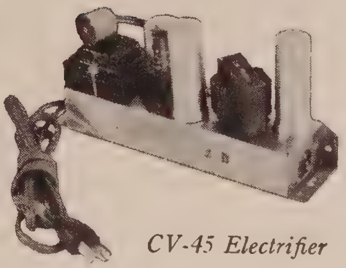
Schematic Diagram



64F3 Wood



64F1 Brown Plastic
64F2 Ivory Plastic



CV-45 Electrifier

RCA VICTOR

64F1, 64F2, 64F3
RC-1037 RC-1037 RC-1037A
Mfr. No. 274
and CV45 ELECTRIFIER
RS-1001 Mfr. No. 274
SERVICE DATA
—1946 No. 3—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

SPECIFICATIONS

Frequency Range........................540 KC.—1600 KC.
Intermediate Frequency............................455 KC.

Tube Complement

(1) RCA—1A7 GT.......................1st Det. Oscillator
(2) RCA—1N5 GT...........................IF Amplifier
(3) RCA—1H5 GT.....2nd Det., A.V.C., and A-F Amplifier
(4) RCA—3Q5 GT..........................Power Output
RCA—6X5G7.........(in CV-45)..........Rectifier

Power Output Rating

Undistorted.......................................160 MW.
Maximum...270 MW.

Loudspeaker (922258-2)

Size......................................4 x 6 inch PM
V.C. impedance at 400 cycles.......................3.4 ohms

Power Supply

(1) RCA Farm Battery Pack—VS022 or equivalent. "A" Battery 1½ volts, Drain—0.24 amperes, "B" Battery 90 volts, Drain—10.5 MA.
(2) Electrifier—(CV-45) 105 to 125 volts AC, 50-60 cycles only.

Cabinet Dimensions

	Height	Width	Depth
64F1 Brown Plastic	6⅞"	11⅞"	7"
64F2 Ivory Plastic	6⅞"	11⅞"	7"
64F3 Wood	9⅝"	17¼"	9¾"

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 1037—64F1, 64F2** **RC 1037A—64F3**
71924	Capacitor—Ceramic, 56 mmf. (C10)
39640	Capacitor—Mica, 330 mmf. (C4)
39630	Capacitor—Mica, 120 mmf. (C8, C9)
70622	Capacitor—Tubular, .002 mfd., 600 volts (C3)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C5, C6)
70611	Capacitor—Tubular, .05 mfd., 400 volts (C2)
70617	Capacitor—Tubular, 0.1 mfd., 200 volts (C1)
38593	Capacitor—Electrolytic, 10 mfd., 90 volts (C7)
71404	Coil—Antenna coil (L1, L2)
71401	Coil—Oscillator coil (L3, L4)
71160	Condenser—Variable tuning condenser (C11, C11a, C12, C12a)
71168	Control—Volume control and power switch (R9, S1)
32634	Cord—Drive cord (approx. 41" long for 64F1 and 64F2 and approx. 43" long for 64F3)
70464	Drum—Drive drum
70469	Indicator—Station selector indicator
71161	Plate—Dial back plate complete with four pulleys less dial—for 64F3
70462	Plate—Dial back plate complete with four pulleys less dial—for 64F1 and 64F2
30550	Plug—4 prong male plug for battery cable
71162	Plug—Battery shorting plug—3 pronged male
36230	Pulley—Drive cord pulley
30499	Resistor—470 ohms, ¼ watt (R4)
14138	Resistor—68,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R5)
30649	Resistor—2.2 megohms, ¼ watt (R6)
31417	Resistor—3.3 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R7, R8)
70467	Shaft—Tuning knob shaft
70377	Shield—Shield for 1A7GT tube
71163	Socket—Battery shorting socket—3 contact female
37605	Socket—Tube socket
70390	Spring—Drive cord spring
71403	Transformer—First I.F. transformer (T1)
71400	Transformer—Second I.F. transformer (T2)
71159	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY **922258-2**
71058	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70471	Back—Cabinet back for 64F1
70472	Back—Cabinet back for 64F2
70475	Clamp—Dial clamps (1 set) for 64F1 and 64F2
70398	Clamp—Dial clamp for 64F3 (2 required)
70476	Dial—Glass dial scale for 64F1 and 64F2
71166	Dial—Glass dial scale for 64F3
37831	Fastener—Push fastener for cabinet back (1 set)
70474	Knob—Tuning control knob—ivory—for 64F2
70473	Knob—Tuning knob—mottled walnut—for 64F1 and 64F3
71165	Knob—Volume control knob—ivory—for 64F2
71164	Knob—Volume control knob—mottled walnut—for 64F1 and 64F3
30900	Spring—Retaining spring for knobs
	CV-45 ELECTRIFIER **RS 1001**
71840	Capacitor—Electrolytic, dual, 2000 mfd., 6 volts (C3, C4)
71844	Capacitor—Electrolytic, dual, 20 mfd., 150 volts (C1, C2)
35069	Fastener—Push fastener for bottom cover
71838	Reactor—Filter Reactor
71839	Rectifier—Rectifier complete with mounting bracket
72787	Resistor—1.2 ohms, ½ watt (R3)
12453	Resistor—27 ohms, ¼ watt (R1)
30788	Resistor—4700 ohms, 1 watt (R2)
71841	Socket—3 contact female socket
31027	Socket—4 contact female socket for battery cable
37605	Socket—Tube socket
71837	Transformer—Power transformer, 117 volt, 60 cycle (T1)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the diagram.

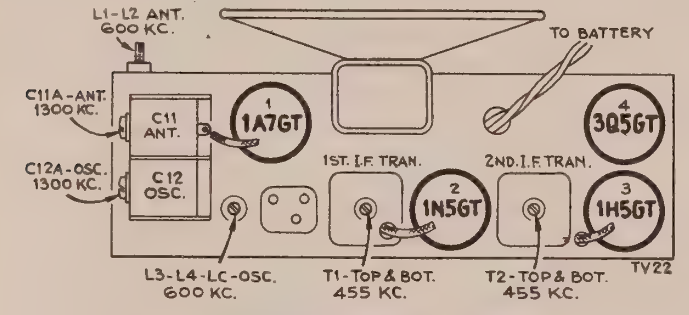
Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust following for maximum peak output
1	I.F. (1N5) grid in series with .1 mfd.	455 kc	Quiet point at the low freq. end of the dial	2nd I.F. trans. T-1
2	1A7 grid in series with .1 mfd.			1st I.F. trans.* T-2
3	Antenna lead (blue) in series with 200 mmf.	1300 kc	1300 kc	C12A (osc.) C11A (ant.)
4		600 kc	600 kc	L1-L2 (ant.) L3-L4 (osc.)
5	Repeat steps 3 and 4			

*Do not repeat step 1.

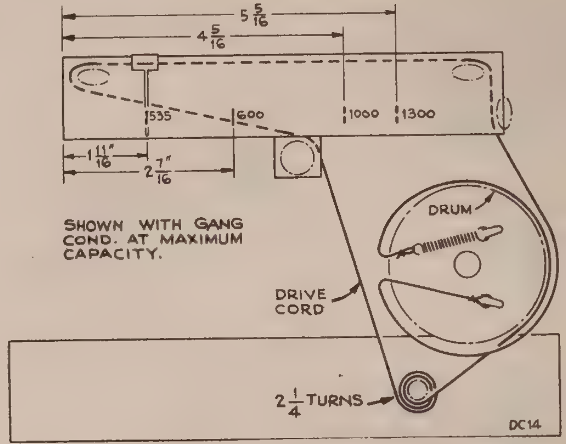


L1-L2 ANT. 600 KC.
TO BATTERY
C11A-ANT. 1300 KC.
C11 ANT.
1A7GT
C12A-OSC. 1300 KC.
C12 OSC.
1ST. I.F. TRAN.
2ND. I.F. TRAN.
1N5GT
1H5GT
3Q5GT
L3-L4-LC-OSC. 600 KC.
T1-TOP & BOT. 455 KC.
T2-TOP & BOT. 455 KC.
TV22

Tube and Trimmer Locations

Critical Lead Dress

1. Keep output plate capacitor dressed close to the chassis.
2. Keep lead from lug A of second IF transformer down and dressed close around the 1H5 tube socket.
3. Dress 1N5 plate lead close to chassis.
4. Dress C1 down and away from the antenna coil.
5. Dress C3 and C5 away from each other.
6. Dress the lead from 2nd IF transformer to the volume control in the open.



5 5/16
4 5/16
535
600
1000
1300
1 11/16
2 7/16
SHOWN WITH GANG COND. AT MAXIMUM CAPACITY.
DRUM
DRIVE CORD
2 1/4 TURNS
DC14

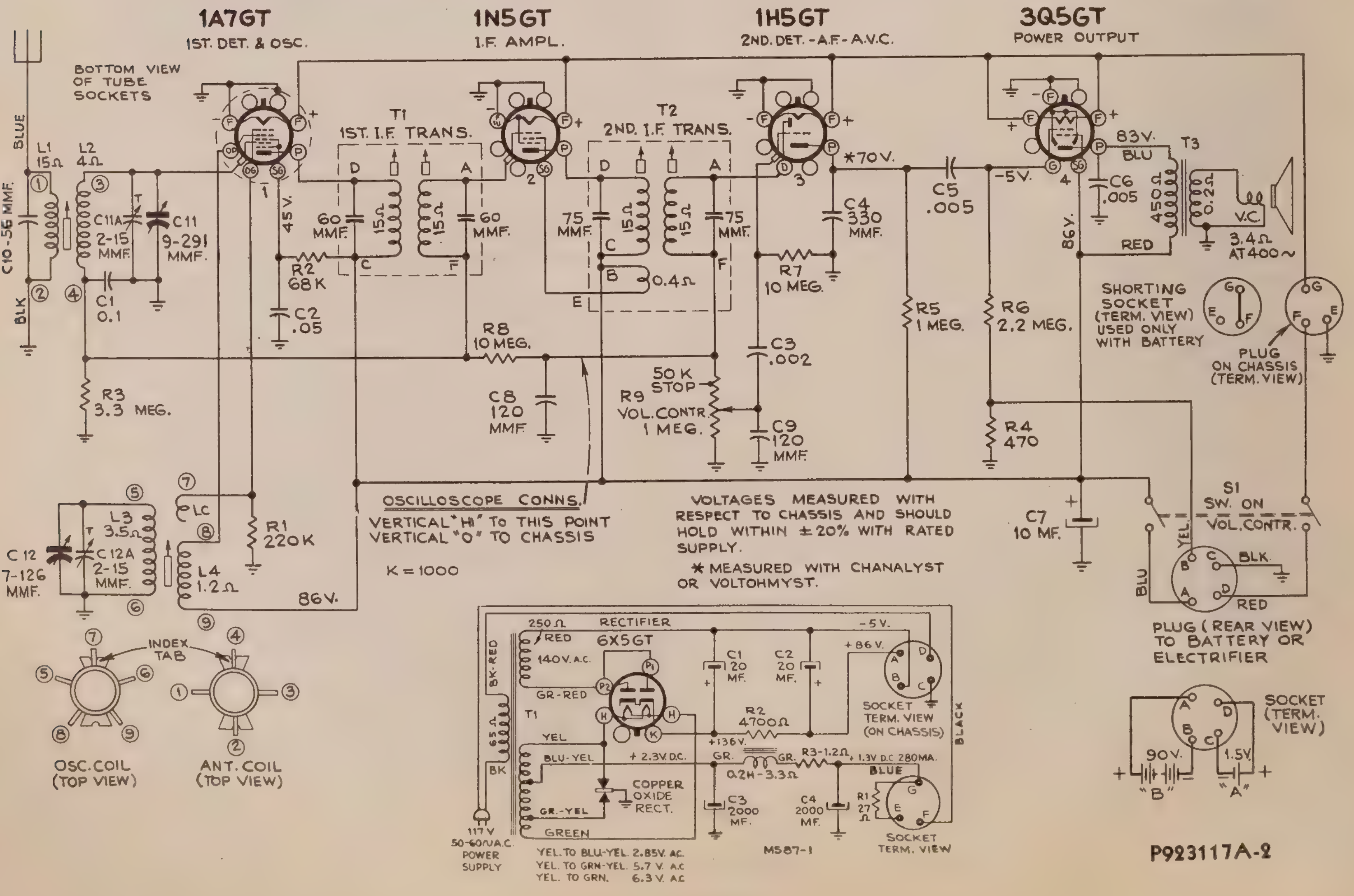
Dial Indicator and Drive Mechanism Showing Alignment Check Points

NOTE:—

When using the electrifier, remove the shorting plug on the chassis adjacent to the 1A7GT tube and replace it with a similar plug, attached to the electrifier. Also connect the remaining plug attached to the electrifier, in place of the normal battery plug. The receiver will operate in the normal manner, using the same control for turning the set on and off.

NOTE:—

Do not plug electrifier into a DC outlet.



1A7GT 1ST. DET. & OSC.
1N5GT I.F. AMPL.
1H5GT 2ND. DET.-A.F.-A.V.C.
3Q5GT POWER OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
BLUE
BLK
L1 15Ω
L2 4Ω
C10-56 MMF.
C11A 2-15 MMF.
C11 9-291 MMF.
C1 0.1
45 V.
R2 68 K
C2 .05
T1 1ST. I.F. TRANS.
60 MMF.
15Ω
60 MMF.
T2 2ND. I.F. TRANS.
75 MMF.
15Ω
75 MMF.
0.4Ω
*70V.
C4 330 MMF.
R7 10 MEG.
C5 .005
-5V.
83V.
BLU
T3
C6 .005
450Ω
0.2Ω
V.C.
3.4Ω AT 400~
RED
86V.
R3 3.3 MEG.
R8 10 MEG.
C8 120 MMF.
50 K STOP
R9 VOL. CONTR. 1 MEG.
C3 .002
C9 120 MMF.
R5 1 MEG.
R6 2.2 MEG.
R4 470
SHORTING SOCKET (TERM. VIEW) USED ONLY WITH BATTERY
PLUG ON CHASSIS (TERM. VIEW)
L3 3.5Ω
C12 7-126 MMF.
C12A 2-15 MMF.
LC
L4 1.2Ω
R1 220 K
86V.
OSCILLOSCOPE CONNS. VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS
K = 1000
VOLTAGES MEASURED WITH RESPECT TO CHASSIS AND SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
C7 10 MF.
S1 SW. ON VOL. CONTR.
YEL
BLU
BLK
RED
PLUG (REAR VIEW) TO BATTERY OR ELECTRIFIER
INDEX TAB
OSC. COIL (TOP VIEW)
ANT. COIL (TOP VIEW)
SOCKET (TERM. VIEW)
90V. "B"
1.5V. "A"
250Ω RECTIFIER 6X5GT
RED
140V. A.C.
GR-RED
T1
65Ω
BK-RED
BK
YEL
BLU-YEL
+2.3V. D.C.
COPPER OXIDE RECT.
GR.-YEL
GREEN
117 V 50-60~A.C. POWER SUPPLY
YEL. TO BLU-YEL. 2.85V. AC
YEL. TO GRN-YEL. 5.7 V. AC
YEL. TO GRN. 6.3 V. AC
C1 20 MF.
C2 20 MF.
-5 V.
+86 V.
R2 4700Ω
+136V.
GR.
0.2H-3.3Ω
R3-1.2Ω
1.3V. D.C. 280 MA.
BLUE
C3 2000 MF.
C4 2000 MF.
R1 27Ω
SOCKET TERM. VIEW (ON CHASSIS)
SOCKET TERM. VIEW
BLACK
MS87-1
P923117A-2

CV-45 Electrifier

RCA VICTOR

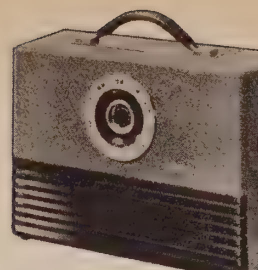
65BR9 PORTABLE

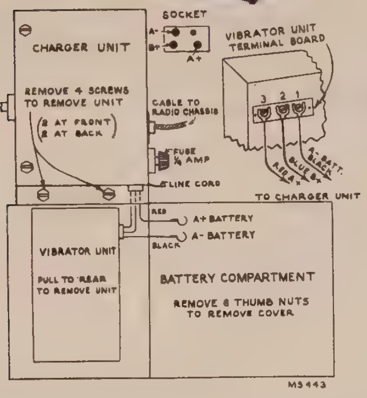
Chassis No. RC-1045—Mfr. No. 274

SERVICE DATA

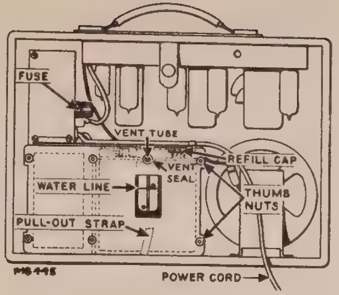
—1946 No. 6—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.





65 BR9 REAR VIEW (BACK REMOVED)



Specifications

Frequency Range	540-1,600 kc
Intermediate Frequency	455 kc
Batteries Required	2 Volt Willard ER-34-2 Wet Battery
Tube Complement	
(1) RCA—1T4	R.F. Amplifier
(2) RCA—1R5	Converter
(3) RCA—1T4	I.F.-Amplifier
(4) RCA—1S5	2nd Det. AVC. & A.F.-Amplifier
(5) RCA—3V4	Power Output
Power Output	
Maximum	.23 watt
Loudspeaker	5″ P.M. 3.4 ohms at 400 cycles
Cabinet Dimensions	Height...10¼″, Width...14″, Depth...5″
Fuse	
Type 3AG	¼ amp.
Current consumption (Chassis) 2.05 V. input to charger.	
"A"	300 ma.
"B"	13 ma.

CRITICAL LEAD DRESS

1. Dress all filament leads next to chassis.
2. Dress loop leads away from tuning drum and battery.
3. Dress output transformer leads away from rear section of gang.
4. Dress r.f. plate lead away from r.f. grid circuit.
5. Dress avc lead away from 2nd IF transformer and associated components.
6. Dress converter plate lead away from chassis and away from output twisted leads.
7. Dress 1st audio plate lead up and away from other wiring.
8. Dress C5 away from chassis.

Caution.—Do not plug this set into a D.C. source as serious damage may result. The ¼ amp. fuse will normally protect the circuit against such damage.

All leads between the battery and the terminals should be free of corrosion, and making good contact. Hum in the set may be caused by high resistance connections.

The receiver will operate on the battery alone with the power cord disconnected and the switch at "AC". **Such operation places an extra load on the battery and should not be used.**

The power unit may be tested without being connected to the radio chassis. Connect an 8,000 ohm, 5 watt resistor between B+ and chassis ground, connect a 7 ohm, 10 watt resistor between A+ and chassis ground. On BATTERY the B+ voltage should be approx. 103 volts, and the A+ voltage should be approx. 2.05 volts. (At end of cable from charger unit) With the unit attached to 117 V. 60 cycle AC and the switch on "AC" the voltage should be slightly higher.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1045
45233	Capacitor—Ceramic, 100 mmf. (C5, C18, C19)
71540	Capacitor—Ceramic, 270 mmf. (C24)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C20)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C25)
70613	Capacitor—Tubular, .03 mfd., 200 volts (C23)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7, C3)
72076	Capacitor—High frequency, 0.5 mfd., 120 volts (C12)
72077	Capacitor—Electrolytic comprising 2 sections of 15 mfd., 150 volts and 1 section of 1200 mfd., 1½ volts (C13A, C13B, C13C)
72827	Capacitor—Tubular, .01 mfd., 400 volts (C26)
72318	Cell—Bias Cell (E2)
72072	Coil—Oscillator Coil (L3, L4)
72073	Condenser—Variable tuning condenser (C1, C2, C10, C11)
38405	Control—Volume control (R11)
32634	Cord—Drive cord (approx. 19″ overall length)
32634	Cord—Indicator cord (approx. 20″ overall length)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
72319	Holder—Bias Cell Holder
72075	Indicator—Station selector indicator
72776	Pin—Contact pin for loop leads
72081	Plate—Dial back plate
30868	Plug—2 contact female plug for speaker cable
72317	Plug—3 prong male plug and shell for power input cable
72074	Pulley—Driven pulley
72079	Pulley—Tuning drive pulley
71580	Resistor—7.5 ohms, ½ watt (R5, R6, R7)
34766	Resistor—1000 ohms, ½ watt (R16)
30436	Resistor—12,000 ohms, ½ watt (R1)
30409	Resistor—27,000 ohms, ½ watt (R4)
3252	Resistor—100,000 ohms, ½ watt (R3, R10)
14583	Resistor—220,000 ohms, ½ watt (R14)
30652	Resistor—1 megohm, ½ watt (R15)
30649	Resistor—2.2 megohm, ½ watt (R2)
30931	Resistor—4.7 megohm, ½ watt (R13)
30992	Resistor—10 megohm, ½ watt (R9, R12)
72080	Retainer—Retainer for drive pulley
72078	Sleeve—Volume control sleeve
51955	Socket—Tube socket, miniature
71037	Socket—Tube socket, miniature, floating
72540	Spring—Indicator or drive cord spring
71399	Transformer—First I.F. Transformer (T3, L5, L6, C8, C9)
71400	Transformer—Second I.F. Transformer (T4, L7, L8, L9, C14, C15)
	MISCELLANEOUS
73042	Back—Cabinet back complete (includes back pull, Z brackets, air vent grommet and metal grommet).
72216	Battery—Wet battery (E1)
34027	Board—3 contact terminal board (screw type) for vibrator lead-in
70643	Capacitor—Tubular, .002 mfd., 1000 volts (C21)
72076	Capacitor—High-frequency, 0.5 mfd., 120 volts (C16, C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C4, C22)
72321	Clip—Battery leads clip terminal
70392	Cord—Power cord
72083	Escutcheon—Dial and escutcheon
72093	Escutcheon—"Pull-AC Plug" escutcheon
72087	Escutcheon—Switch escutcheon
71595	Foot—Rubber foot for cabinet (4 required)
72104	Fuse—0.25 ampere (F1)
72106	Grommet—Rubber grommet to protect power cord
72320	Handle—Carrying handle
48551	Holder—Fuse holder
72094	Knob—Knob for "Pull-AC" plug
72088	Knob—Switch knob
72084	Knob—Tuning knob
72085	Knob—Volume control knob
72086	Loop—Antenna loop (L1)
72978	Monogram—"RCA Victor" metal monogram
72098	Packing—One set of cushioning for battery
72097	Packing—One set of cushioning for vibrator
72102	Reactor—Iron core reactor (L10, L11, L13)
72322	Reactor—Wound on 1 megohm resistor (L12)
72103	Rectifier—Dry disc (CR1)
72090	Reflector—Reflector for dial escutcheon
30880	Resistor—150 ohms, ½ watt (R8)
3078	Resistor—10,000 ohms, ½ watt (R17)
72082	Socket—3 contact female
72108	Socket—Vibrator socket
4982	Spring—Retaining spring for tuning knob
30900	Spring—Retaining spring for volume control or switch knob
72089	Spring—Switch escutcheon spring
72100	Switch—Power switch (S1)
73041	Strap—Leather strap, including socket and button to secure back
72099	Transformer—Charger transformer (T1)
72109	Transformer—Vibrator transformer (T2)
72107	Vibrator—Plug-in vibrator (D1)
72091	Window—Tuning window
	SPEAKER ASSEMBLIES (92572-2)
30870	Plug—2 prong male plug for speaker
72201	Speaker—5″ PM speaker complete with cone and voice coil less transformer and plug
71159	Transformer—Output transformer (T5)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

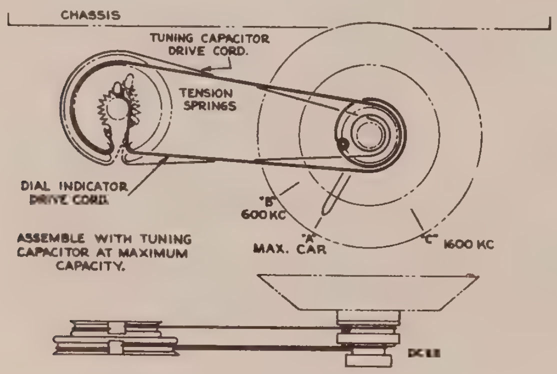
Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	High side of loop (Green lead) in series with 0.1 mfd.	455 kc	Gang at max. cap.	L7, L8, 2nd I.F. trans L5, L6, 1st I.F. trans.
2	220 mmf. in series with a single turn loop 4x8 in., approx. 3 in. from receiver loop. (Bottom shield cover in place and chassis in cabinet)	1600 kc	1600 kc "C"	C11 Osc. C2 R.F.
3		600 kc	600 kc "B"	L4 Osc. Rock in
4		1600 kc	1600 kc "C"	C11 Osc.

Note.—In alignment, if possible, it is advisable to utilize an external source of "B" voltage. This will facilitate accessibility of the various trimmers.


CHASSIS
TUNING CAPACITOR DRIVE CORD.
TENSION SPRINGS
DIAL INDICATOR DRIVE CORD.
"B" 600 KC
"A" MAX. CAP.
"C" 1600 KC
ASSEMBLE WITH TUNING CAPACITOR AT MAXIMUM CAPACITY.
DC11

Calibration.—It is not necessary to refer to the dial scale for calibration. Three reference marks on the dial backing arc used. With the gang completely meshed, the pointer should be set at "A" as shown in the diagram. For alignment purposes, 600 kc. will then fall at "B", and 1600 kc. will be at "C"

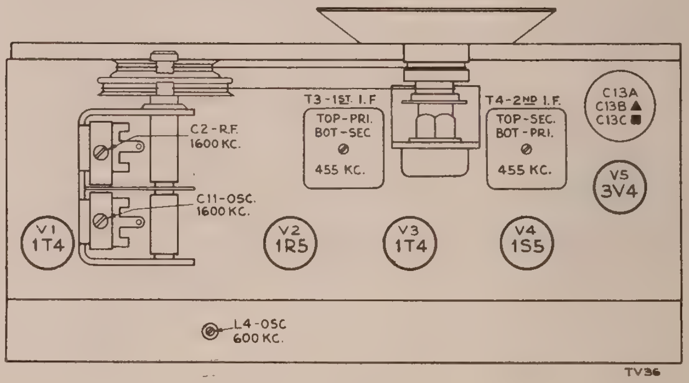
Operation.—This set operates on battery, or 117 Volt, 60 cycle AC (Battery in set, and in good condition). Provision is made so that when the set is operating on "AC" the battery is receiving a slight charge. In the "Charge" position, the rate of charge is much higher. A completely discharged battery will recharge in about 24 hours on "Charge". It is possible to overcharge the battery in the "AC" position, so it is advisable to play the receiver on "Battery" until slightly discharged whenever the battery has become fully charged on "AC"

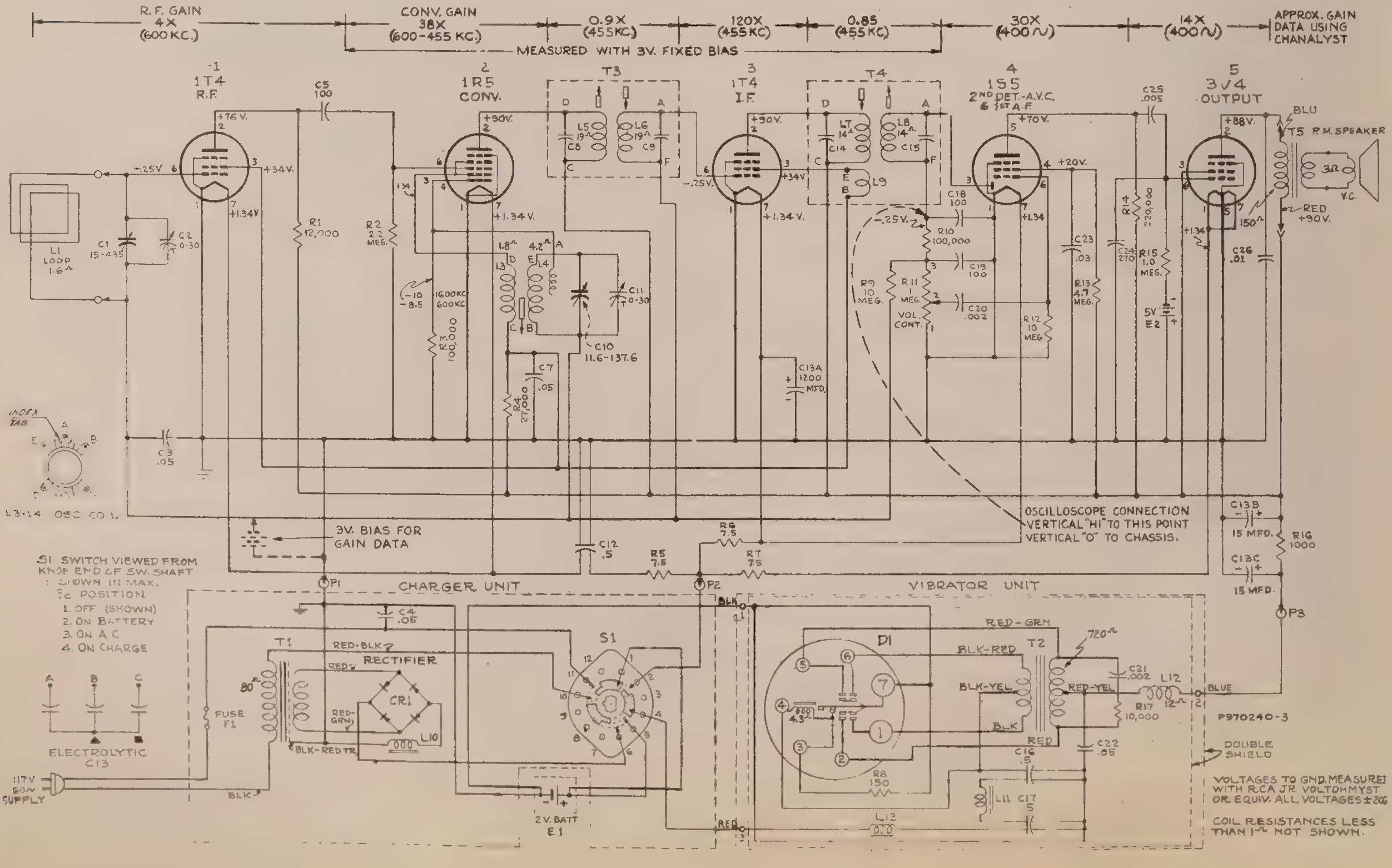
Battery Charging.—With the cabinet back removed, two balls (1 red and 1 green) may be seen through an opening in the battery compartment cover. Both balls at top—battery full charged—Green ball sinks when battery is 20% discharged. Both balls at bottom—battery 90% discharged. Re-charge by connecting set to 115 volt 60 cycle power supply and set power switch to "CHG". Do not overcharge—check fuse if battery does not charge—do not allow battery to remain in discharged condition.

Water level.—Water Level should be checked frequently and **distilled** water or tap water, if it is used for cooking and drinking, added if required to bring liquid level up to the indicator line visible through the opening in the battery compartment cover. To add water; Remove line cord from power supply, remove cabinet back, remove thumb nuts and battery compartment cover, pull the battery out sufficiently to expose the red fill cap (pull on strap at bottom of battery), do not strain battery leads. Unscrew the red fill cap and add sufficient water to bring liquid level up to the indicator line.

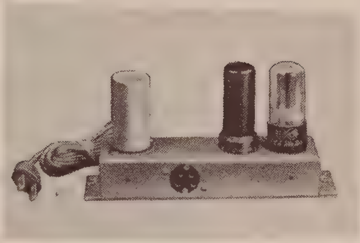
Caution.—The liquid is dilute sulphuric acid, it is destructive to clothing and will burn the hands—do not spill.

Replace the red refill cap, push battery back into place and attach the back to the metal box, making sure during this assembly that the vent compression seal is in place and slides over the battery vent tube. Then tighten up the thumb nuts and replace the back on the receiver.


T3-1ST. I.F.
TOP-PRI.
BOT-SEC
455 KC.
T4-2ND I.F.
TOP-SEC.
BOT-PRI.
455 KC.
C13A
C13B ▲
C13C ■
C2-R.F. 1600 KC.
C11-OSC. 1600 KC.
V1 1T4
V2 1R5
V3 1T4
V4 1S5
V5 3V4
L4-OSC 600 KC.
TV36


R.F. GAIN 4X (600 KC.)
CONV. GAIN 38X (600-455 KC.)
0.9X (455KC)
120X (455KC)
0.85 (455KC)
MEASURED WITH 3V. FIXED BIAS
30X (400∿)
14X (400∿)
APPROX. GAIN DATA USING CHANALYST
1 1T4 R.F.
2 1R5 CONV.
3 1T4 I.F.
4 1S5 2ND DET.-A.V.C. & 1ST A.F.
5 3V4 OUTPUT
T3
T4
T5 P.M. SPEAKER
3Ω V.C.
BLU
RED +90V.
L1 LOOP 1.6Ω
C1 15-435
C2 0-30
C3 .05
C5 100
R1 12,000
R2 2.2 MEG.
R3 100,000
R4 27,000
C7 .05
C10 11.6-137.6
C11 0-30
L3 L4
L5 L6 L7 L8 L9
C8 C9 C14 C15
C13A 1200 MFD.
C18 100
C19 100
C20 .002
R9 10 MEG.
R10 100,000
R11 1 MEG. VOL. CONT.
R12 10 MEG.
R13 4.7 MEG.
R14 220,000
R15 1.0 MEG.
C23 .03
C24 270
C25 .005
C26 .01
5V E2
INDEX TAB
L3-L4 OSC COIL
3V. BIAS FOR GAIN DATA
OSCILLOSCOPE CONNECTION VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS.
C12 .5
R5 7.5
R6 7.5
R7 7.5
C13B 15 MFD.
C13C 15 MFD.
R16 1000
S1 SWITCH VIEWED FROM KNOB END OF SW. SHAFT SHOWN IN MAX. CC POSITION
1. OFF (SHOWN)
2. ON BATTERY
3. ON A.C.
4. ON CHARGE
ELECTROLYTIC C13
117V 60~ SUPPLY
CHARGER UNIT
VIBRATOR UNIT
P1 P2 P3
C4 .05
T1
RECTIFIER
CR1
FUSE F1
L10
S1
2V. BATT E1
D1
T2
C21 .002
L12
R17 10,000
C16 .5
C17 .5
C22 .05
R8 150
L11
L13
P970240-3
DOUBLE SHIELD
VOLTAGES TO GND. MEASURED WITH RCA JR VOLTOHMYST OR EQUIV. ALL VOLTAGES ±20%
COIL RESISTANCES LESS THAN 1Ω NOT SHOWN.

Model 65F



CV-42 Electrifier

RCA VICTOR

65F and CV-42 Electrifier

Chassis No. (RC-1004E) (RS-1000)
Mfr. No. 274

SERVICE DATA

—1947 . . . 2—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Circuit Description.—Superheterodyne with one stage of radio frequency amplification, automatic volume control and class "A" beam power output. Battery operation, with optional AC-DC socket power attachment available. Model 65F can be operated on 105-125 volts AC, 50-60 cycles, or 105-125 DC, by means of an RCA CV-42 Electrifier.

Frequency Range	540-1,720 kc
Intermediate Frequency	455 kc
Maximum Power Output	0.3 watt
Loudspeaker (5 inch) 92515-1	
Voice coil impedance at 400 cycles	3.4 ohms
Power Supply	
Battery	RCA VS022 or equivalent
Battery Drain	
"A" 1½ volt section	0.3 ampere
"B" 90 volt section	10 m a. (Switch in "Battery Saver Position") 14 m a. (Maximum Output Position)
Power Consumption	
With CV-42 Electrifier Unit (switch in "Electric" position)	22.5 watts
Cabinet Dimensions (inches)	18 x 9¼ x $10\frac{9}{16}$

IMPORTANT

Remove any external ground connections when using the Electrifier.

CAUTION: Turn power switch off (counter-clockwise) when installing or replacing tubes or batteries.

RECEIVER IS SHIPPED READY FOR BATTERY OPERATION. FOR ELECTRIFIER OPERATION, REMOVE TAPE FROM LUG AT REAR OF CHASSIS AND CONNECT LUG TO 65F RECEIVER CHASSIS.

On a DC power supply, if no reception is obtained, reverse the plug in the outlet and retune. On an AC supply, reversal of the plug may reduce hum. CAUTION! Do not touch Radio Chassis unless power plug is removed from socket.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-1004E)
38675	Arm—"On-Off" indicator arm
39604	Capacitor—Mica, 10 mmf. (C40)
39640	Capacitor—Mica, 330 mmf. (C6)
38672	Capacitor—Mica trimmer, consisting of 1 section of 120 mmf. and 1 section of 45-80 mmf. (C21, C22)
70712	Capacitor—Tubular, .0018 mfd., 700 volts (C5)
70627	Capacitor—Tubular, .005 mfd., 1200 volts (C7, C8, C19)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C2)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C1)
36718	Capacitor—Electrolytic, 10 mfd., 10 volts (C18, C23)
38705	Capacitor—Electrolytic, 25 mfd., 90 volts (C20)
38344	Coil—Antenna coil (L1, L2)
38345	Coil—Oscillator coil (L3, L4)
70378	Coil—Wave trap (L10, L11)
38599	Condenser—Variable tuning condenser (C9, C10, C11, C17)
36080	Control—Volume control and power switch (R6, S1, S2)
34662	Cord—Drive cord (approx. 59" overall length)
35069	Fastener—Push fastener for dial plate
36090	Indicator—Station selector indicator
38350	Lever—Indicator arm actuating lever
38673	Plate—Dial back plate complete with drive cord pulleys and indicator arm
30550	Plug—4 prong male plug for battery cable
32289	Pulley—Drive cord pulley
39930	Resistor—22 ohms, 1 watt (R17)
30498	Resistor—390 ohms, ¼ watt (R10, R11)
12262	Resistor—680 ohms, ¼ watt (R14)
30734	Resistor—5600 ohms, ¼ watt (R12)
30787	Resistor—47,000 ohms, ¼ watt (R5)
14138	Resistor—68,000 ohms, ¼ watt (R3)
14583	Resistor—220,000 ohms, ¼ watt (R2)
30652	Resistor—1 megohm, ¼ watt (R8)
30649	Resistor—2.2 megohms, ¼ watt (R9)
12928	Resistor—3.3 megohms, ¼ watt (R1, R13)
30992	Resistor—10 megohms, ¼ watt (R4, R7)
36897	Shaft—Tuning knob shaft
70377	Shield—Tube shield for IN5GT and IH5GT tubes
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
38349	Spring—Indicator arm return spring
38670	Switch—"Battery-Electric" power switch (S3, S4)
70379	Transformer—First I.F. transformer (L5, L6, C12, C13)
70380	Transformer—Second I.F. transformer (L7, L8, C3, C4, C14, C15)
33726	Washer—"C" for tuning knob shaft
	SPEAKER ASSEMBLIES Stamped 92515-1K
70381	Speaker—5" P.M. speaker less output transformer
70991	Transformer—Output transformer
	Stamped 92515-1P
70381	Speaker—5" P.M. speaker less output transformer
70992	Transformer—Output transformer
	Stamped 92515-1F
70381	Speaker—5" P.M. speaker less output transformer
70993	Transformer—Output transformer NOTE: If stamping on speaker in instrument does not agree with above speaker numbers, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36462	Clamp—Clamp for glass window
72785	Decal—Control marker decal
72796	Dial—Glass dial scale
36886	Knob—Power switch knob
36722	Knob—Volume control or tuning knob
30900	Spring—Retaining spring for knob
38679	Window—Glass window for dial
	CV-42 ELECTRIFIER
38702	Ballast—Plug-in ballast tube resistor
38701	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, 1 section of 30 mfd., 150 volts, and 1 section of 250 mfd., 10 volts
30847	Capacitor—.05 mfd., 400 volts
28451	Cover—Insulating cover for electrolytic capacitor
35069	Fastener—Push fastener for bottom cover
28452	Plate—Bakelite mounting plate for electrolytic capacitor
38702	Resistor—Ballast tube resistor
30730	Resistor—2,700 ohms, ½ watt
31027	Socket—Power output socket
31251	Socket—Tube or ballast resistor socket
38702	Tube—Ballast tube resistor

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscillograph are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

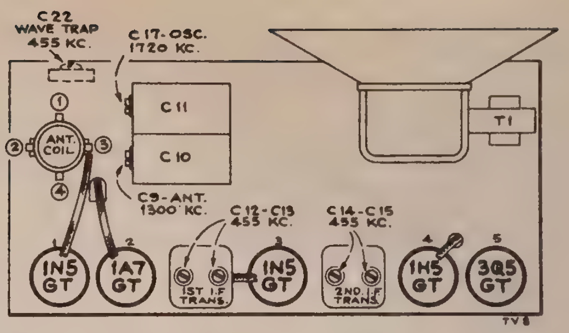
Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

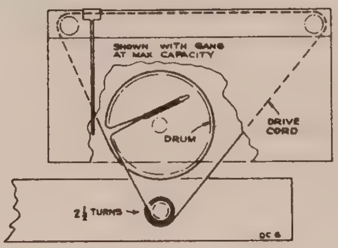
Step	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid in series with .01 mfd.	455 kc	Quiet point between 550 and 750 kc	C14, C15 (2nd I-F Trans.)
2	1A7GT grid in series with .01 mfd.			C12, C13 (1st I-F Trans.)
3	Antenna terminal in series with 200 mmfd.	1,720 kc	Tuning condenser rotor plates all out	C17 (osc.)
4		1,300 kc	1,300 kc signal	C9 (ant.)
5		455 kc	Quiet point between 550 and 750 kc	Adjust C22 for minimum output on strong 455 kc signal

Precautionary Lead Dress.—

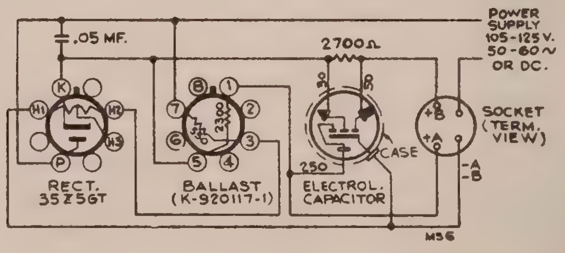
1. The lead from the 3Q5 plate to output transformer should be dressed under clip, and away from audio input leads.
2. All filament wires should be dressed close to chassis.
3. Keep AVC lead connecting C1 (0.1 mfd. filter) to antenna coil away from the 1A7GT plate.
4. Keep blue plate leads coming from I.F. transformers short and close to chassis.
5. Keep yellow leads connected to oscillator coil away from trap coil.
6. Keep grid lead of 1N5GT RF tube away from 1A7GT grid.
7. Keep green lead from second I.F. transformer short and close to ground.

Top-View

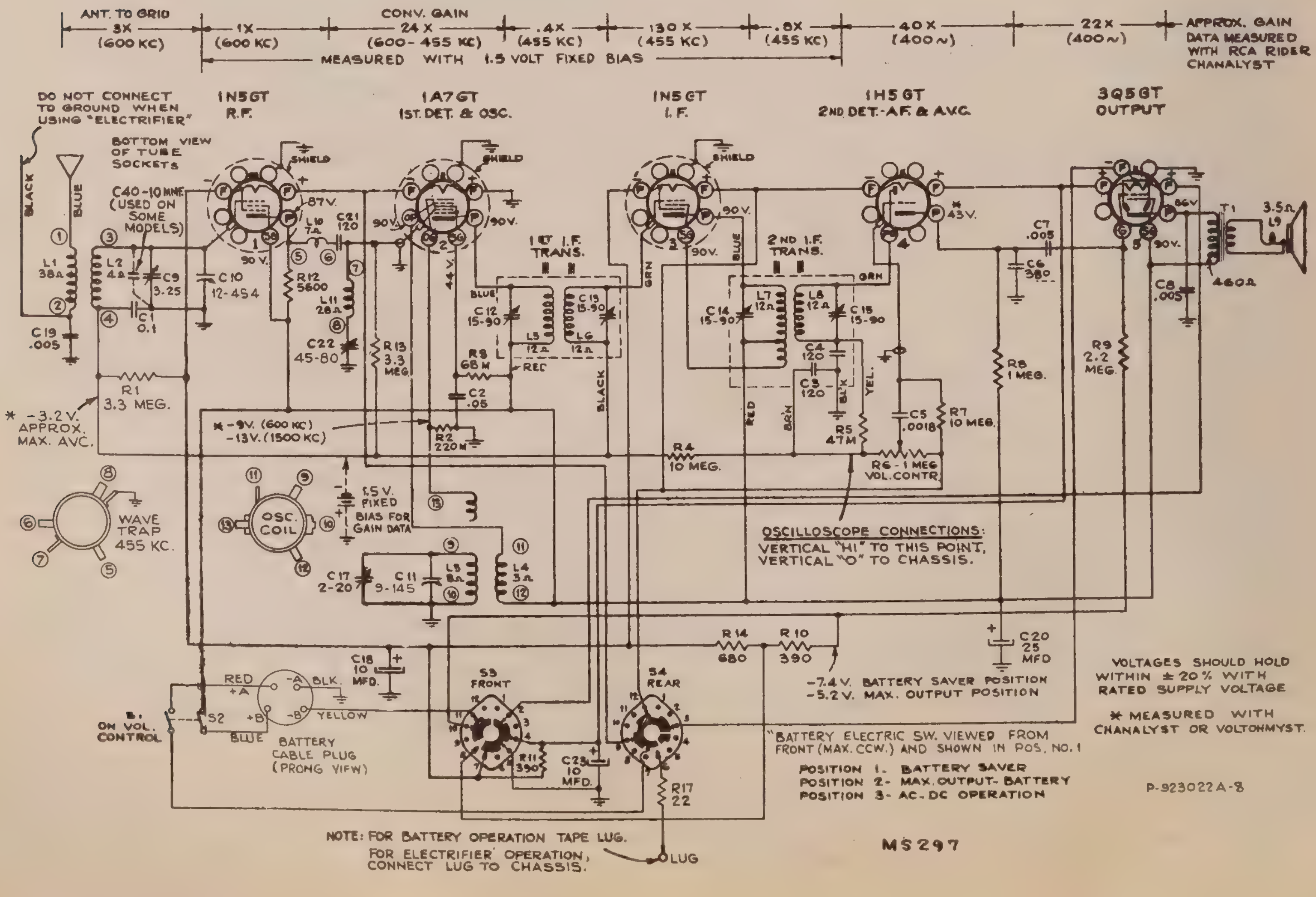

C22 WAVE TRAP 455 KC.
C17-OSC. 1720 KC.
C11
C10
ANT. COIL
T1
C9-ANT. 1300 KC.
C12-C13 455 KC.
C14-C15 455 KC.
1N5 GT
1A7 GT
1ST I.F. TRANS.
1N5 GT
2ND I.F. TRANS.
1H5 GT
3Q5 GT


SHOWN WITH GANG AT MAX CAPACITY
DRUM
DRIVE CORD
2½ TURNS

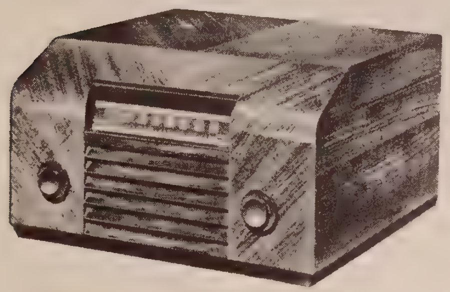
Dial Cord Assembly


.05 MF.
2700Ω
POWER SUPPLY 105-125 V. 50-60~ OR DC.
SOCKET (TERM. VIEW)
CASE
250
RECT. 35Z5GT
BALLAST (K-920117-1)
ELECTROL. CAPACITOR
-A
-B
M36

Electrifier Schematic


ANT. TO GRID 3X (600 KC)
1X (600 KC)
CONV. GAIN 24 X (600-455 KC)
.4X (455 KC)
130 X (455 KC)
.8X (455 KC)
40 X (400~)
22 X (400~)
MEASURED WITH 1.5 VOLT FIXED BIAS
APPROX. GAIN DATA MEASURED WITH RCA RIDER CHANALYST
DO NOT CONNECT TO GROUND WHEN USING "ELECTRIFIER"
1N5GT R.F.
1A7GT 1ST. DET. & OSC.
1N5GT I.F.
1H5GT 2ND DET.-A.F. & A.V.C.
3Q5GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
C40-10 MMF. (USED ON SOME MODELS)
BLACK
BLUE
SHIELD
87V.
90V.
44V.
43V.
86V.
L1 38Ω
L2 4Ω
C9 3-25
C1 0.1
C10 12-454
R12 5600
L10 7Ω
C21 120
L11 28Ω
C22 45-80
R13 3.3 MEG.
C19 .005
R1 3.3 MEG.
* -3.2 V. APPROX. MAX. AVC.
* -9V. (600 KC) -13V. (1500 KC)
R2 220M
1ST I.F. TRANS.
2ND I.F. TRANS.
C12 15-90
C13 15-90
L5 12Ω
L6 12Ω
R3 68M
C2 .05
C14 15-90
C15 15-90
L7 12Ω
L8 12Ω
C4 120
C3 120
R5 47M
C5 .0018
R7 10 MEG.
R6 - 1 MEG VOL. CONTR.
R4 10 MEG.
C7 .005
C6 380
R8 1 MEG.
R9 2.2 MEG.
C8 .005
T1
3.5Ω L9
460Ω
WAVE TRAP 455 KC.
OSC. COIL
1.5 V. FIXED BIAS FOR GAIN DATA
C17 2-20
C11 9-145
L3 8Ω
L4 3Ω
OSCILLOSCOPE CONNECTIONS: VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
C18 10 MFD.
R14 680
R10 390
C20 25 MFD
-7.4 V. BATTERY SAVER POSITION
-5.2 V. MAX. OUTPUT POSITION
RED +A
-A BLK.
+B
-B YELLOW
BLUE
S2
S1 ON VOL. CONTROL
BATTERY CABLE PLUG (PRONG VIEW)
S3 FRONT
S4 REAR
R11 390
C23 10 MFD.
R17 22
LUG
NOTE: FOR BATTERY OPERATION TAPE LUG. FOR ELECTRIFIER OPERATION, CONNECT LUG TO CHASSIS.
"BATTERY ELECTRIC SW. VIEWED FROM FRONT (MAX. CCW.) AND SHOWN IN POS. NO. 1
POSITION 1- BATTERY SAVER
POSITION 2- MAX. OUTPUT- BATTERY
POSITION 3- AC-DC OPERATION
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY VOLTAGE
* MEASURED WITH CHANALYST OR VOLTOHMYST.
P-923022A-8
MS297

Model 65U, 65AU



Model 65U-1

RCA VICTOR
VICTROLA

65U, 65AU, 65U-1

Radio-Phonograph Combination
Chassis No. RC-1017A; RC-1017B
Mfr. No. 274

SERVICE DATA

—1946 No. 13—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Electrical and Mechanical Specifications

Five-Tube, Single-Band, Superheterodyne Receiver

Frequency Range .... 540-1,600 kc

Intermediate Frequency .... 455 kc

Power Output

Undistorted .... 1.5 watts
Maximum .... 2.4 watts

Loudspeaker "PM"

Size .... 5 inch round or 4 x 6 inch elliptical
V.C. Impedance .... 3.4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 60 cycles with 960260-2 record changer .... 60 watts
105-125 volts, AC, 50 cycles with 960260-4 record changer .... 60 watts

IMPORTANT—Do not plug chassis into a d-c power supply.

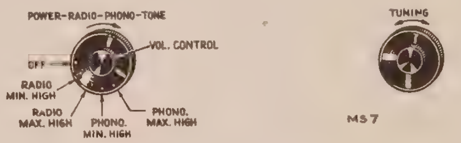
REFER TO SERVICE DATA FOR MODEL 960260 FOR INFORMATION AND PARTS ON RECORD CHANGER

	Height	Width	Depth
Cabinet dimensions (inches)	10½	17¼	17¼
Chassis overall (inches)	6⅝	14	6¼
Chassis base (inches)	1⅝	14	3¾

Tuning Drive Ratio 14:1

Phonograph

Type .... Automatic (960260)
Record Capacity .... Twelve 10-in., Ten 12-in.
Turntable Speed .... 78 r.p.m.
Type Pickup .... Crystal
Motor Power Consumption .... 25 watts



Control Positions

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1017A—RC-1017B
70389	Bearing—Tuning knob shaft bearing
70407	Button—Plug button (2 required)
70997	Capacitor—Mica, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C25, C26)
70403	Coil—Oscillator coil
70383	Condenser—Variable tuning condenser complete with drum
72756	Control—Volume control
32634	Cord—Drive cord (approx. 48″ overall length)
70392	Cord—Power cord
70384	Drum—Drive drum
70397	Gear—Power or radio-phono switch gear
70395	Gear—Volume control gear and spring assembly
70404	Indicator—Station selector indicator
70391	Insulator—Bakelite insulator for phono input socket
11765	Lamp—Dial lamp
72311	Loop—Antenna loop
70382	Plate—Dial back plate complete with pulleys less dial
30868	Plug—2 contact female plug for "AC" cable
36230	Pulley—Drive cord pulley
72313	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ¼ watt (R7)
6134	Resistor—1200 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1, R5)
30648	Resistor—470,000 ohms, ¼ watt (R8)
12928	Resistor—3.3 megohms, ¼ watt (R4)
31455	Resistor—5.6 megohms, ¼ watt (R6)
14974	Screw—#8-32 x 3/16″ long set screw for lower gear
70388	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket—moulded
70390	Spring—Drive cord tension spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power or radio phono switch
70386	Transformer—First I.F. transformer
70387	Transformer—Second I.F. transformer
70385	Transformer—Output transformer
33726	Washer—"C" washer for tuning knob shaft
70406	Washer—Spring washer for volume control
	ELLIPTICAL SPEAKER ASSEMBLY 922279-1
70405	Speaker—4″ x 6″ PM speaker complete
	ELLIPTICAL SPEAKER ASSEMBLY 922258-2
71058	Speaker—4″ x 6″ PM speaker complete
	ROUND SPEAKER ASSEMBLY 92510-1
70413	Speaker—5″ Round PM speaker complete
	NOTE: Order speaker by number stamped on speaker, referring also to model number of instrument, and description of part.
	MISCELLANEOUS
X1605	Board—Baffle board and grille for eliptical speaker
X1613	Board—Baffle board and grille for round speaker
70398	Clamp—Dial clamps (1 set)
71984	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
70402	Dial—Glass dial
71595	Foot—Rubber feet for cabinet (4 required) (with nail)
72894	Foot—Rubber foot for cabinet (4 required) (screw mounting)
70707	Hinge—Lid hinge (2 required)
70401	Knob—Power switch and radio-phono switch knob
70400	Knob—Tuning knob
70399	Knob—Volume control knob
71815	Mounting—One set of hardware consisting of four springs, two spring washers and two rubber washers to mount record changer.
70390	Spring—Drive cord tension spring
70396	Spring—Retaining spring for power-radio-phono switch knob
14270	Spring—Retaining spring for tuning and volume control knob
71824	Stud—Stud and screw to mount lid hinge (1 set)
39545	Support—Lid support

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

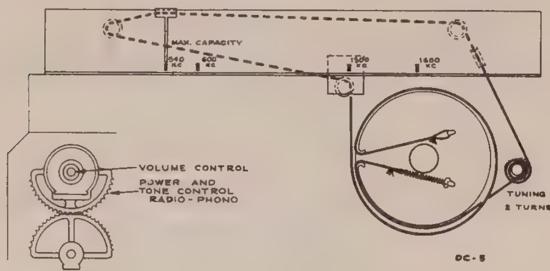
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing woodscrews before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.


MAX. CAPACITY
540 KC
600 KC
1500 KC
1600 KC
VOLUME CONTROL
POWER AND TONE CONTROL RADIO - PHONO
TUNING 3 TURNS
DC-5

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B". Keep the output signal as low as possible to avoid a-v-c action.

NOTE:

Late production has a resistor (270,000 ohms) R12 connected across the phono input jack of the radio chassis. This resistor was on the record changer (960260-2) in the early production (Serial Nos. B-1001 to B-6000 and B-28,500 to B-30,000).

The location of this resistor may be checked by measuring the shunt resistance across the phono input jack of the radio chassis and across the phono output cable of the changer mechanism.

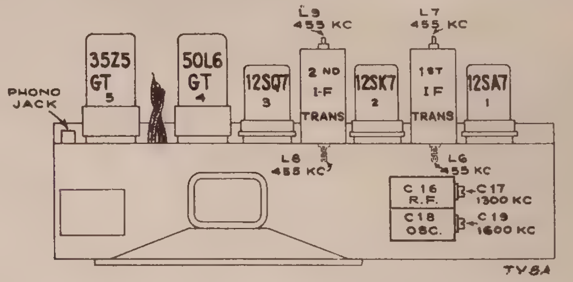
Change in Capacitors:

In some chassis C15 is 660 mmf. (comprising 2 330 mmf. capacitors) instead of 820 mmf. In some chassis C24 is 6.8 mmf. instead of 5.6 mmf.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

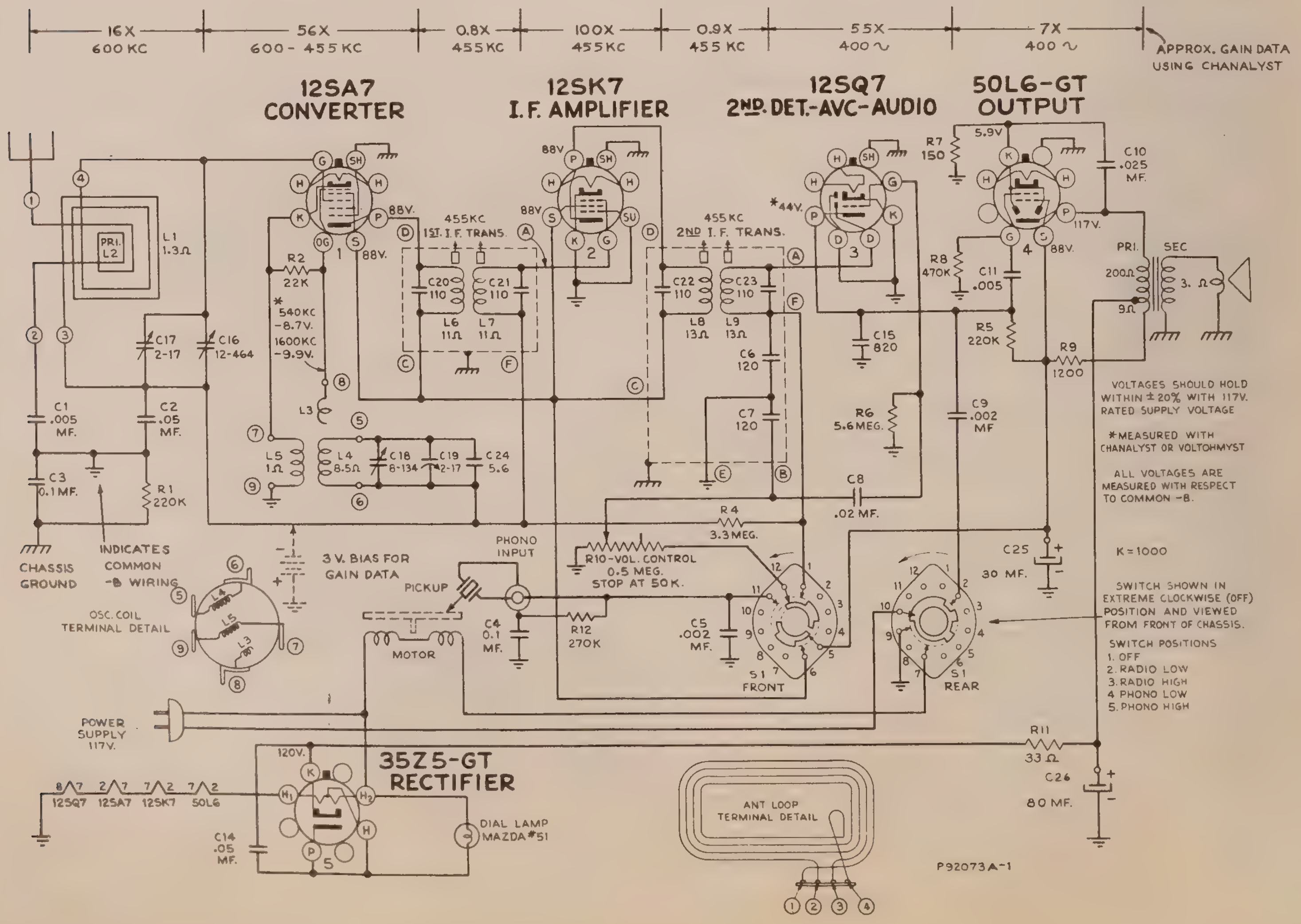
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer *
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal Frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

*Do not readjust L8 or L9 when test oscillator is connected to 1st Det.


L9 455 KC
L7 455 KC
35Z5 GT 5
50L6 GT 4
12SQ7 3
2 ND I-F TRANS
12SK7 2
1 ST IF TRANS
12SA7 1
PHONO JACK
L8 455 KC
L6 455 KC
C 16 R.F.
C17 1300 KC
C 18 OSC.
C 19 1600 KC
TV8A

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d-c, as this would damage the motor.

Reversal of plug in outlet receptacle may reduce hum.


16X 600 KC
56X 600 - 455 KC
0.8X 455 KC
100X 455 KC
0.9X 455 KC
55X 400 ~
7X 400 ~
APPROX. GAIN DATA USING CHANALYST
12SA7 CONVERTER
12SK7 I.F. AMPLIFIER
12SQ7 2ND DET.-AVC-AUDIO
50L6-GT OUTPUT
35Z5-GT RECTIFIER
L1 1.3Ω
PRI. L2
C17 2-17
C16 12-464
C1 .005 MF.
C2 .05 MF.
C3 0.1 MF.
R1 220K
R2 22K
*540KC -8.7V. 1600KC -9.9V.
88V.
455KC 1ST. I.F. TRANS.
C20 110
C21 110
L6 11Ω
L7 11Ω
L3
L4 8.5Ω
L5 1Ω
C18 8-134
C19 2-17
C24 5.6
455KC 2ND I.F. TRANS.
C22 110
C23 110
L8 13Ω
L9 13Ω
C6 120
C7 120
*44V.
C15 820
R6 5.6MEG.
R8 470K
C11 .005
R7 150
5.9V
C10 .025 MF.
117V.
PRI. SEC
200Ω
9Ω
3. Ω
R5 220K
R9 1200
C9 .002 MF
C8 .02 MF.
R4 3.3MEG.
R10-VOL. CONTROL 0.5 MEG. STOP AT 50K.
PHONO INPUT
PICKUP
C4 0.1 MF.
R12 270K
C5 .002 MF.
S1 FRONT
S1 REAR
C25 30 MF.
MOTOR
CHASSIS GROUND
INDICATES COMMON -B WIRING
3 V. BIAS FOR GAIN DATA
OSC. COIL TERMINAL DETAIL
POWER SUPPLY 117V.
120V.
8/7 2/7 7/2 7/2
12SQ7 12SA7 12SK7 50L6
C14 .05 MF.
DIAL LAMP MAZDA #51
R11 33 Ω
C26 80 MF.
ANT LOOP TERMINAL DETAIL
P92073A-1

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. RATED SUPPLY VOLTAGE

*MEASURED WITH CHANALYST OR VOLTOHMYST

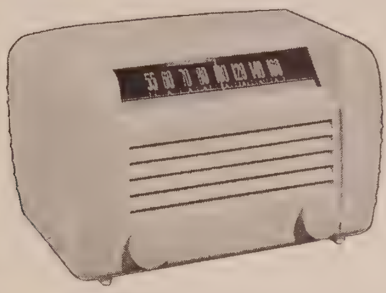
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.

K = 1000

SWITCH SHOWN IN EXTREME CLOCKWISE (OFF) POSITION AND VIEWED FROM FRONT OF CHASSIS.

SWITCH POSITIONS
1. OFF
2. RADIO LOW
3. RADIO HIGH
4 PHONO LOW
5. PHONO HIGH

65X1
(Walnut)



65X2
(Ivory)

65X8
(Walnut)
65X9
(Ivory)

RCA VICTOR

65X1, 65X2

1st. Production—Chassis No. RC-1034
2nd. Production—Chassis No. RC-1064

65X8, 65X9

Chassis No. RC-1034—Mfr. No. 274

SERVICE DATA

1946..No. 1
(Supersedes 1st. Edition)

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range	540-1600 kc
Intermediate Frequency	455 kc

Power Output

Undistorted	1.0 watt
Maximum	1.5 watts

Tube Complement

(1) RCA-12SA7	Converter
(2) RCA-12SK7	I.F. Amplifier
(3) RCA-12SQ7	2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50L6GT	Power Output
(5) RCA-35Z5GT	Rectifier

Pilot Lamp	Mazda No. 51, 6-8 volts, 0.2 amp.

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC	30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Loudspeaker (922258-1)

Type	4″ x 6″ PM
V. C. Impedance	3.4 ohms at 400 cycles

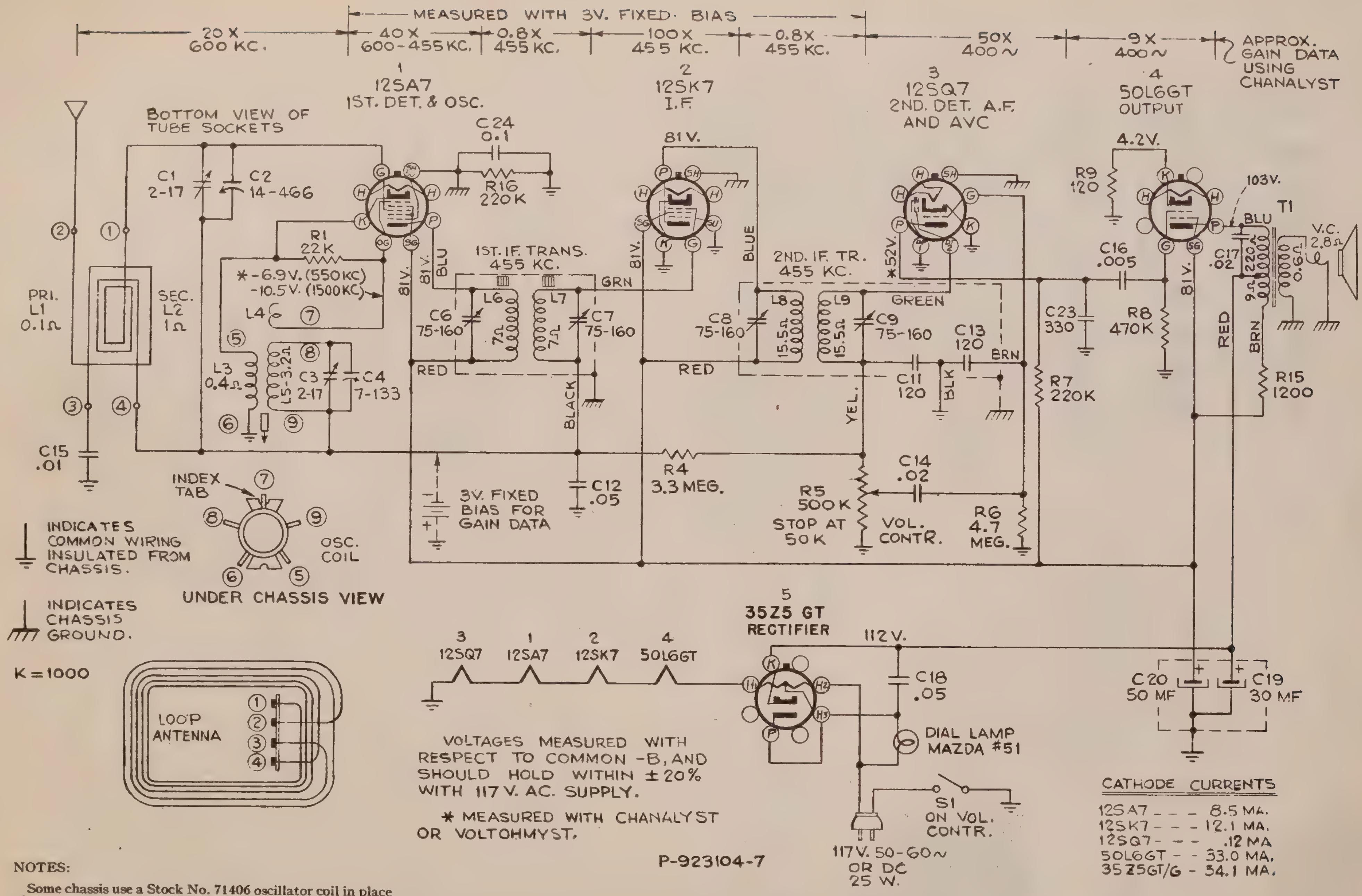
Cabinet Dimensions	**Height**	**Width**	**Depth**
Cabinet (Outside)	7″	11¾″	7½″

Shipping Weight	9 lbs.
Tuning Drive Ratio	20:1

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1034—RC 1064
39622	Capacitor—Mica, 56 mmf (for RC-1064 & some RC-1034) (C5)
71612	Capacitor—Mica, 150 mmt. (tor RC- 1064). C13.
72571	Capacitor—Mica, 330 mmf. (C23)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
70408	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C19A, C19B or C19, C20)
70477	Coil—Oscillator coil (for some RC-1034) (L3, L4, L5)
71406	Coil—Oscillator coil (for some RC-1034) (L3, L4)
73048	Coil—Oscillator coil (for RC-1064) (L1, L2)
70643	Condenser—Variable tuning condenser complete with drive drum (for RC-1034) (C1, C2, C3, C4)
73047	Condenser—Variable tuning condenser complete with drive drum (for RC-1064) (C1, C2, C3, C4)
70322	Control—Volume control and power switch (R-5, S-1)
	Cord—Drive cord (approx. 40″ overall length)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
70469	Indicator—Station selector indicator
11765	Lamp—Dial lamp—Mazda #51
70468	Loop—Antenna loop (for RC-1034) (L1, L2)
73049	Loop—Antenna loop complete (for RC-1064)
70462	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
	Resistor—Fixed composition, 120 ohms ±10%, ½ watt (R9)
	Resistor—Fixed composition, 1200 ohms ±10%, 1 watt (R15)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R1)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R7, R16)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 3.3 megohms ±20%, ½ watt (R4)
	Resistor—Fixed composition, 4.7 megohms ±20%, ½ watt (R6)
70467	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, molded
70390	Spring—Drive cord tension spring
70465	Transformer—First I.F. transformer (for RC-1034) (L6, L7, C6, C7)
73036	Transformer—First I.F. transformer (for RC-1064) (T1)
70466	Transformer—Second I.F. transformer (for RC-1034) (L8, L9, C8, C9)
73037	Transformer—Second I.F. transformer (for RC-1064) (T2)
70385	Transformer—Output transformer (for RC-1034) (T1)
72296	Transformer—Output transformer (for RC-1064) (T3)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 922258-1
70470	Speaker—4″ x 6″ elliptical speaker complete with cone and voice coil
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4″ x 6″ elliptical speaker complete with cone and voice coil
	MISCELLANEOUS
70471	Back—Cabinet back for 65X1
70472	Back—Cabinet back for 65X2
71794	Back—Cabinet back for 65X8.
71795	Back—Cabinet back for 65X9.
Y1338	Cabinet—Brown plastic cabinet for 65X1
Y1339	Cabinet—Ivory plastic cabinet for 65X2
Y1365	Cabinet—Brown plastic cabinet for 65X8.
Y1366	Cabinet—Ivory plastic cabinet for 65X9.
70475	Clamp—Dial clamp (1 set)
70476	Dial—Glass dial scale
37831	Fastener—Push fastener (1 set) for cabinet back
70473	Knob—Control knob—mottled walnut—for 65X1 or 65X8
71821	Knob—Control knob—maroon—for 65X1
70474	Knob—Control knob—ivory—for 65X2 or 65X9
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS


MEASURED WITH 3V. FIXED BIAS
20 X 600 KC.
40 X 600-455 KC.
0.8 X 455 KC.
100 X 455 KC.
0.8 X 455 KC.
50 X 400 ~
9 X 400 ~
APPROX. GAIN DATA USING CHANALYST
1 12SA7 1ST. DET. & OSC.
2 12SK7 I.F.
3 12SQ7 2ND. DET. A.F. AND AVC
4 50L6GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
C1 2-17
C2 14-466
C24 0.1
R16 220K
R1 22K
*-6.9V. (550KC) -10.5V. (1500KC)
L4
PRI. L1 0.1Ω
SEC. L2 1Ω
L3 0.4Ω
L5-3.2Ω
C3 2-17
C4 7-133
C15 .01
81V.
BLU
1ST. IF. TRANS. 455 KC.
C6 75-160
L6 7Ω
L7 7Ω
C7 75-160
GRN
RED
BLACK
C12 .05
3V. FIXED BIAS FOR GAIN DATA
BLUE
2ND. IF. TR. 455 KC.
C8 75-160
L8 15.5Ω
L9 15.5Ω
C9 75-160
GREEN
*52V.
C11 120
C13 120
BRN
BLK
YEL.
R4 3.3 MEG.
C14 .02
R5 500K STOP AT 50K
VOL. CONTR.
R6 4.7 MEG.
R7 220K
C23 330
C16 .005
R8 470K
4.2V.
R9 120
103V.
BLU
T1
C17 .02
220Ω
9Ω
0.6Ω
V.C. 2.8Ω
RED
BRN
R15 1200
INDEX TAB
OSC. COIL
UNDER CHASSIS VIEW
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
INDICATES CHASSIS GROUND.
K=1000
LOOP ANTENNA
5 35Z5 GT RECTIFIER
112V.
C18 .05
C20 50 MF
C19 30 MF
DIAL LAMP MAZDA #51
S1 ON VOL. CONTR.
117V. 50-60~ OR DC 25 W.
3 12SQ7
1 12SA7
2 12SK7
4 50L6GT
P-923104-7

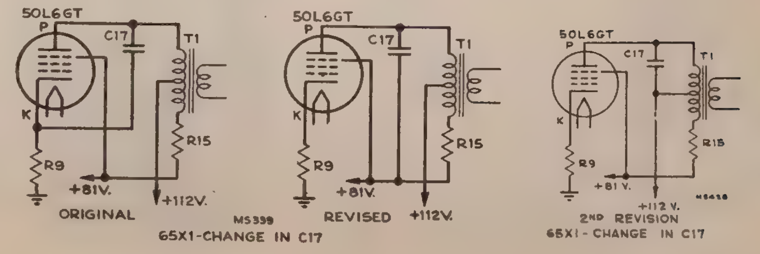
VOLTAGES MEASURED WITH RESPECT TO COMMON -B, AND SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

CATHODE CURRENTS	
12SA7	8.5 MA.
12SK7	12.1 MA.
12SQ7	.12 MA
50L6GT	33.0 MA.
35Z5GT/G	54.1 MA.

Schematic Circuit Diagram RC-1034

Capacitor C17 which was originally connected between Plate and Cathode of the 50L6GT output tube and later connected between Plate and Screen Grid of the 50L6GT output tube is now connected between Plate and the tap lead of the output transformer (lead connects to 35Z5GT cathode).


50L6GT
P
K
C17
T1
R9
R15
+81V.
+112V.
ORIGINAL
REVISED
2ND REVISION
M5339
M5438

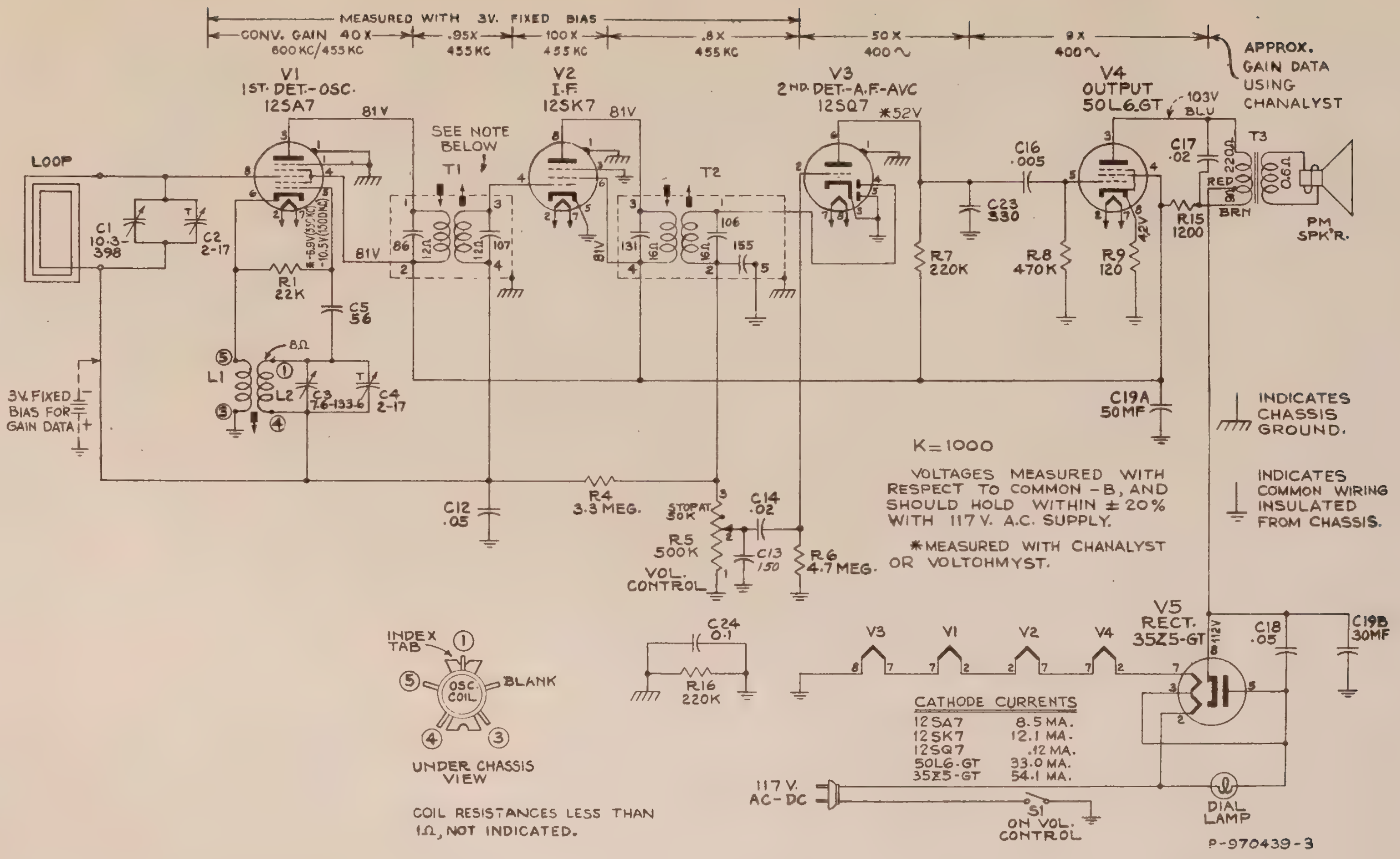
65X1-CHANGE IN C17

65X1 - CHANGE IN C17

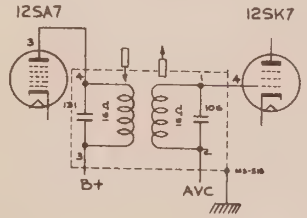
NOTES:

Some chassis use a Stock No. 71406 oscillator coil in place of the one shown in the schematic. When the Stock No. 71406 oscillator coil is used, there will be a Stock No. 39622 mica capacitor (56 mmf.) used in place of the capacity winding shown in the schematic. It is connected between 7 and 8 of the osc. coil.

Output Transformer Color Coding.—The lead coloring on the output transformer may not correspond with the coloring given on the schematic. It is therefore necessary to rely on resistance measurements to determine lead connections, rather than the color coding given on the schematic.


MEASURED WITH 3V. FIXED BIAS
CONV. GAIN 40X 600KC/455KC
.95X 455KC
100X 455KC
.8X 455KC
50X 400～
9X 400～
APPROX. GAIN DATA USING CHANALYST
V1 1ST. DET.-OSC. 12SA7
V2 I.F. 12SK7
V3 2ND. DET.-A.F.-AVC 12SQ7
V4 OUTPUT 50L6.GT
81V
*52V
103V BLU
LOOP
C1 10.3-398
C2 2-17
SEE NOTE BELOW
T1
T2
T3
R1 22K
C5 56
-6.9V(35KC)
-10.5V(300KC)
8Ω
L1
L2
C3 7.6-133.6
C4 2-17
3V. FIXED BIAS FOR GAIN DATA
C12 .05
R4 3.3 MEG.
STOP AT 30K
R5 500K VOL. CONTROL
C13 150
C14 .02
R6 4.7 MEG.
C16 .005
C23 330
R7 220K
R8 470K
R9 120
12V
C17 .02
220Ω
0.6Ω
RED
BRN
R15 1200
PM SPK'R.
C19A 50MF
K=1000
VOLTAGES MEASURED WITH RESPECT TO COMMON -B, AND SHOULD HOLD WITHIN ± 20% WITH 117V. A.C. SUPPLY.
*MEASURED WITH CHANALYST OR VOLTOHMYST.
INDICATES CHASSIS GROUND.
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
INDEX TAB
OSC. COIL
BLANK
UNDER CHASSIS VIEW
COIL RESISTANCES LESS THAN 1Ω, NOT INDICATED.
C24 0.1
R16 220K
V3
V1
V2
V4
V5 RECT. 35Z5-GT
112V
C18 .05
C19B 30MF
CATHODE CURRENTS
12SA7 8.5 MA.
12SK7 12.1 MA.
12SQ7 .12 MA.
50L6-GT 33.0 MA.
35Z5-GT 54.1 MA.
117 V. AC-DC
S1 ON VOL. CONTROL
DIAL LAMP
P-970439-3

A capacitor C13 150 mmf. has been added between terminal No. 2 of the volume control and common insulated wiring.


12SA7
12SK7
B+
AVC

NOTE: In some chassis C13 is 100 mmf.

Schematic Circuit Diagram—RC-1064

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver colume control to maximum.

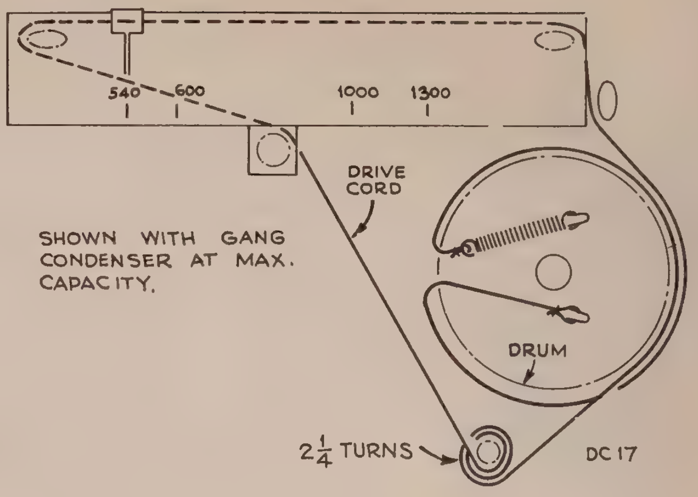
Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet "RCA Victor Receiver Alignment."


540
600
1000
1300
DRIVE CORD
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DRUM
2¼ TURNS
DC 17

Dial Indicator and Drive Mechanism

Alignment Tabulation RC-1034

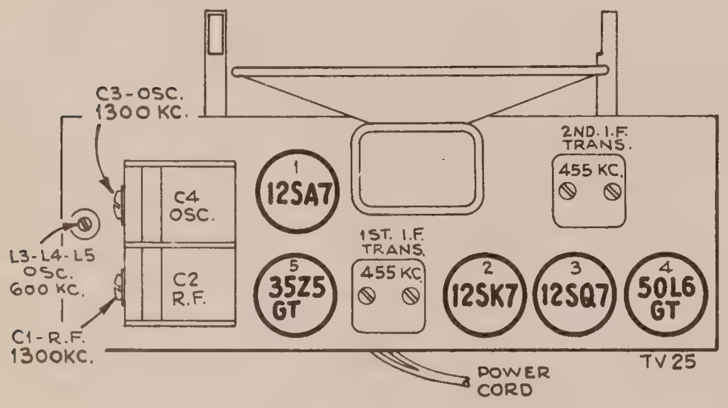
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	C8 and C9 2nd. I-F transformer
2	Stator of C2 through 0.1 mfd.			*C6 and C7 1st. I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C3 (osc.) C1 (ant.)
4		600 kc	600 kc "A" Band	L5 (osc.) Rock gang
5	Repeat steps 3 and 4			

* Do not readjust C8 or C9 when test oscillator is connected to C2.

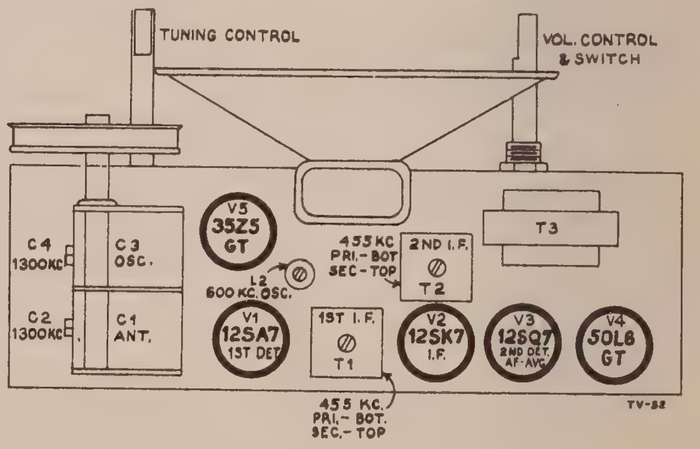
Alignment Tabulation RC-1064

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	T2 Top & bottom 2nd. I-F trans.
2	Stator of C1 through 0.1 mfd.			*T1 Top & bottom 1st. I-F trans.
3	Short wire placed near loop antenna	1,300 kc	1,300 kc	C4 (osc.) C2 (ant.)
4		600 kc	600 kc "A" Band	L2 (osc.) Rock gang
5	Repeat steps 3 and 4			

* Do not readjust T2 when test oscillator is connected to C1


C3-OSC.
1300 KC.
C4
OSC.
L3-L4-L5
OSC.
600 KC.
C2
R.F.
C1-R.F.
1300KC.
1
12SA7
5
35Z5
GT
1ST. I.F.
TRANS.
455 KC
2ND. I.F.
TRANS.
455 KC.
2
12SK7
3
12SQ7
4
50L6
GT
TV 25
POWER
CORD

Tube and Trimmer Locations RC-1034


TUNING CONTROL
VOL. CONTROL
& SWITCH
C4
1300KC
C3
OSC.
C2
1300KC
C1
ANT.
V5
35Z5
GT
L2
600 KC. OSC.
V1
12SA7
1ST DET
455 KC
PRI.-BOT
SEC-TOP
2ND I.F.
T2
1ST I.F.
T1
455 KC.
PRI.- BOT.
SEC.- TOP
T3
V2
12SK7
I.F.
V3
12SQ7
2ND DET.
AF-AVC
V4
50L6
GT
TV-32

Tube and Trimmer Locations RC-1064

Intermittent Distortion

When servicing these receivers, check position of capacitor (C16) (between 12SQ7 plate and 50L6GT grid). It should be positioned in a manner to prevent the possibility of contact with a loop antenna mounting screw which protrudes through the chassis at this point.

Critical Lead Dress

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress all heater leads next to chassis.
3. Dress power cord toward output transformer away from volume control and audio circuits.
4. Dress capacitor (C14) toward switch and parallel to chassis length.
5. Dress capacitor (C16) back against rear chassis apron.
6. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
7. Dress pilot lamp leads over second I-F transformer and away from tubes.
8. Dress blue lead from output transformer against front apron and away from I-F leads.
9. Dress contact on oscillator section of gang condenser back away from oscillator coil adjustment.

RCA VICTOR

66BX PORTABLE

Chassis No. RC-1040; RC-1040A; RC-1040B
Mfr. No. 274

SERVICE DATA

—1946 No. 6—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range	540-1,600 kc
Intermediate Frequency	455 kc

Power Supply Rating

110 to 125 volts, AC 50 or 60 cycles, or DC	14 watts
Batteries required	One RCA Battery Pack VS019 or equivalent

Tube Complement

(1) RCA—1T4	R.F.
(2) RCA—1R5	Converter
(3) RCA—1T4	I.F.-Amplifier
(4) RCA—1S5	2nd Det. AVC. & A.F.-Amplifier
(5) RCA—3Q4—RC-1040	Power Output
RCA—3V4—RC-1040A, RC-1040B	Power Output
*(6) RCA—117Z3	Rectifier

*Chassis No. RC-1040B is equipped with a selenium rectifier in place of the 117Z3.

Current Consumption

Battery Operation	"A" 50 milliamperes, "B" 13 milliampere
Total Rect. Current (117 volt, 60 cycle)	61 mils.

Power Output

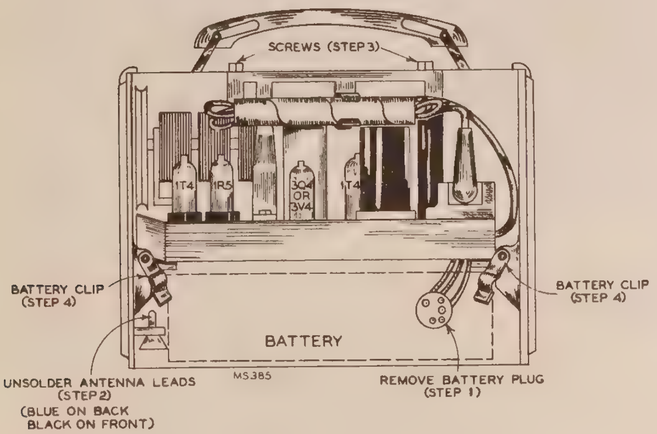
Maximum	.23 watt
Loudspeaker	4 x 6 in. elliptical P.M. 3.4 ohms at 400 cycles

Cabinet Dimensions

Height....13¼ inches, Width....9½ inches, Depth....5½ inches

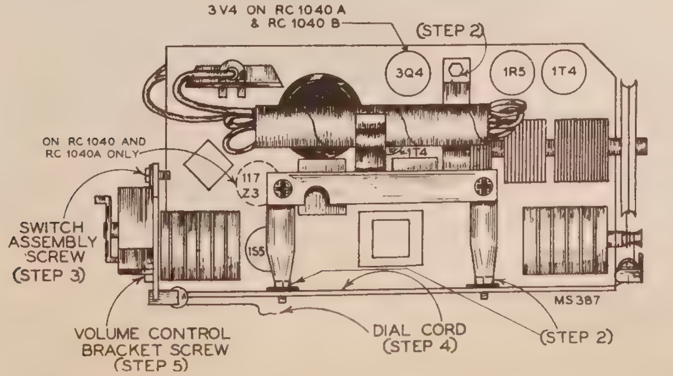
CAUTION.—

1. **Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.**
2. **When cleaning the aluminum portion of the case use soap and water or cleaning fluid. Do not use abrasive cleansers.**


SCREWS (STEP 3)
1T4
1R5
3Q4 OR 3V4
1T4
BATTERY CLIP (STEP 4)
BATTERY CLIP (STEP 4)
BATTERY
UNSOLDER ANTENNA LEADS (STEP 2) (BLUE ON BACK BLACK ON FRONT)
MS385
REMOVE BATTERY PLUG (STEP 1)

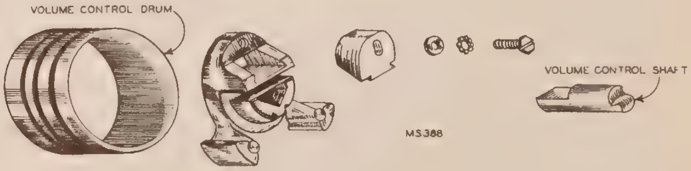
To Remove Chassis from Cabinet.

1. Remove battery and disconnect battery plug.
2. Disconnect antenna in cabinet.
3. Remove the two screws in the top of the cabinet (beneath handle).
4. Remove the two battery clips.
5. Remove the chassis from the cabinet.


3V4 ON RC 1040 A & RC 1040 B
(STEP 2)
3Q4
1R5
1T4
ON RC 1040 AND RC 1040A ONLY
117 Z3
1T4
1S5
SWITCH ASSEMBLY SCREW (STEP 3)
VOLUME CONTROL BRACKET SCREW (STEP 5)
DIAL CORD (STEP 4)
(STEP 2)
MS 387

To Replace the Volume Control.—

1. Remove tubes 4 & 6 (1S5, and 117Z3, unless set is equipped with a selenium rectifier).
2. Remove the three screws holding the power cord bracket assembly. (Do not damage insulating washers).
3. Remove the screw holding the switch assembly, and remove the switch
4. Remove the dial cord from the pulley.
5. Remove the screw holding the volume control bracket assembly.
6. Loosen the screw which maintains pressure on the expansion assembly.
7. Remove the drum.
8. Remove the expansion assembly from the volume control shaft.
9. Remove the nut holding the volume control to bracket.



Using External Loop.—

A loop antenna is mounted inside the cabinet. Under normal conditions this will give satisfactory reception. If however the receiver is used in a shielded compartment such as an automobile, airplane or railroad train, an RCA VICTOR EXTERNAL LOOP ANTENNA can be used.

This external loop antenna has a strap connector cord with identical two prong plugs on either end, this makes it convenient in connecting it to the circuit through the receptacle located in the left hand side of the chassis.

Open the case, plug the external loop antenna cord into the socket (it will only go in one way), bring the strap out through the slot in the case and attach the external loop antenna by means of the suction cup to any convenient vertical surface.

This external loop antenna can be stored in the cabinet, in the compartment below the battery pack, and the cord in the small compartment in the lower right hand corner of the cabinet.

AC-DC Operation.—

This receiver will operate on 105 to 125 volts, AC 50 or 60 cycles, or DC.

A power cord is stored in the fiber tube which is clamped above the chassis inside the cabinet. To open the cabinet, slide the two plastic feet in the rear of the cabinet toward each other, and raise the back cover upward on its hinges. Then pull the power cord plug out of the socket on the top of the chassis as shown, and take out and unroll the power cord. A slot in the bottom of the cabinet allows the closing of the cabinet with the power cord passing through. Close the cabinet with the cord extending through the slot and insert the plug into a convenient electrical outlet.

When returning to battery operation, be sure to replace the power plug in its socket inside the case with the cord stored in the fiber tube.

NOTE. If reception is not obtained on DC, reverse plug in outlet receptacle This may also reduce hum on AC operation.

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

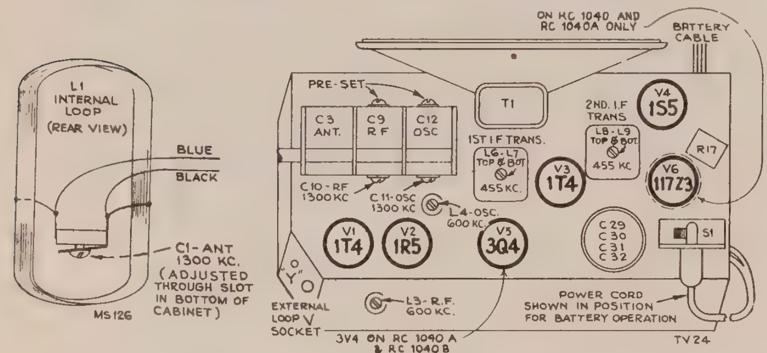
Calibration Scale.—The calibrated dial scale is permanently connected to chassis. It can therefore be used directly as a reference for alignment.

With the gang at full mesh set the dial pointer so that the pointer is 19/32 inches to the right of the left hand edge of the dial plate as indicated in the dial cord drawing.

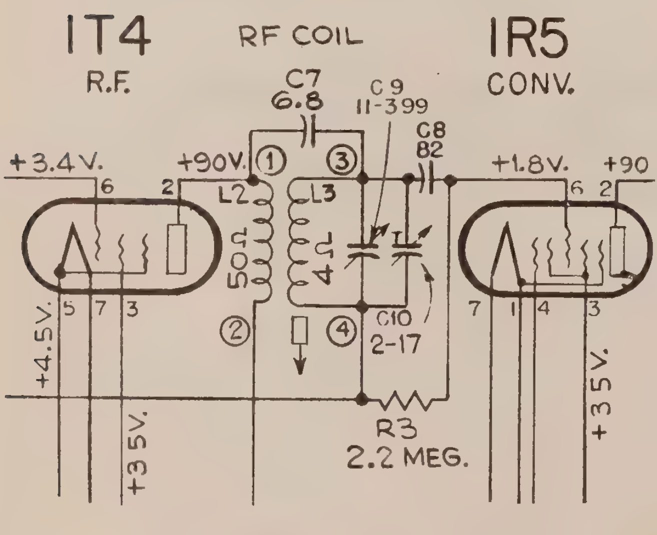
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	High side of loop (Blue lead) in series with 0.1 mfd.	455 kc	Gang at max. cap.	L8, L9 (2nd I.F. Trans.)* L6, L7 (1st I.F. Trans.)
2	High side of loop (Blue lead) in series with 0.1 mfd. (Bottom shield cover in place and chassis out of cabinet)	1300 kc	1300 kc	C11—(osc.) C10—(R.F.)
3		600 kc	600 kc	L4 (osc.) L3 (R.F.)
** 4	220 mmf. in series with a single turn loop 4x8 in., approx. 3 in. from receiver loop. (Chassis in cabinet C-1 connected and rear lid of cabinet closed)	1300 kc	1300 kc	C1 (loop)

*If two peaks are found with top slugs use the one with stud in the outer position.

**Adjust C-1 loop cap with back cover of case closed. Access to trimmer is made through small slot in case provided for cable of external loop.


L1 INTERNAL LOOP (REAR VIEW)
BLUE
BLACK
C1-ANT 1300 KC. (ADJUSTED THROUGH SLOT IN BOTTOM OF CABINET)
MS126
ON RC 1040 AND RC 1040A ONLY
BATTERY CABLE
PRE-SET
C3 ANT.
C9 RF
C12 OSC
T1
2ND. I.F TRANS
V4 1S5
1ST I F TRANS.
L6-L7 TOP & BOT. 455KC.
L8-L9 TOP & BOT. 455 KC
R17
V3 1T4
V6 117Z3
C10-RF 1300KC
C11-OSC 1300 KC
L4-OSC. 600 KC.
V1 1T4
V2 1R5
V5 3Q4
C29 C30 C31 C32
S1
"Y"
EXTERNAL LOOP SOCKET
L3-R.F. 600KC.
POWER CORD SHOWN IN POSITION FOR BATTERY OPERATION
3V4 ON RC 1040 A & RC 1040 B
TV24

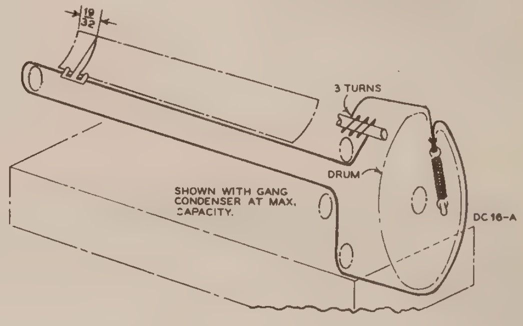
Tube and Trimmer Locations


1T4
R.F.
RF COIL
1R5
CONV.
C7 6.8
C9 11-399
C8 82
+3.4V.
+90V.
①
③
+1.8V.
+90
6
2
L2
L3
50Ω
4Ω
②
④
C10 2-17
5 7 3
7 1 4 3
+4.5V.
+3.5V.
+3.5V.
R3 2.2 MEG.

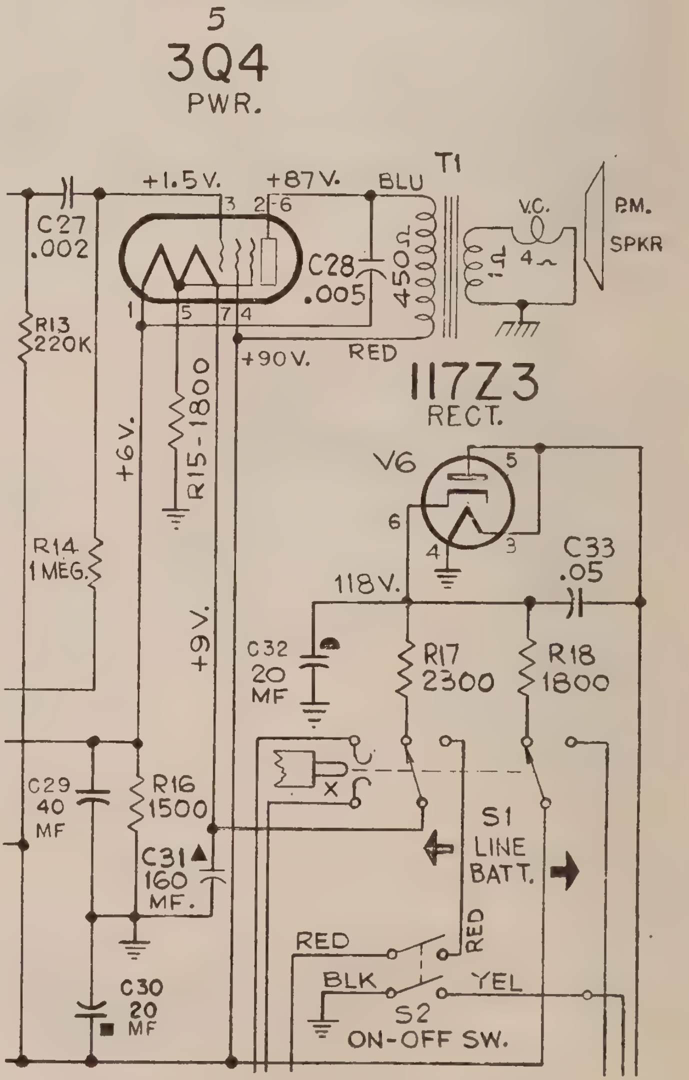
CONVERTER INPUT CIRCUIT
CHASSIS No. RC-1040
(Showing location of C8 and R3)

CRITICAL LEAD DRESS

1. Dress all filament leads next to chassis.
2. Keep the leads short on the ends of the three components which connect to the grid terminal (#6) of the r.f. socket. (R-1, R-2, C-2).
3. Separate leads to front and center sections of gang as far as possible and away from tubes.
4. Dress loop leads away from tuning drum and battery.
5. Dress output transformer leads away from rear section of gang.
6. Dress r.f. plate lead away from r.f. grid circuit.
7. Dress components and wiring near external loop socket to clear external loop pins.
8. Dress avc lead away from 2nd IF transformer and associated components.
9. Dress converter plate lead away from chassis and away from output twisted leads.
10. Dress twisted output leads up and away from other wiring.
11. Dress volume control cable, switch cable, and line receptacle leads away from rectifier tube and resistor case.
12. Dress 1st audio plate lead up and away from other wiring.
13. Do not restrict floating action of sockets by tight wiring.


19/32
3 TURNS
DRUM
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DC 16-A

Dial-Indicator and Drive Mechanism


5
3Q4
PWR.
C27 .002
+1.5V.
+87V.
BLU
T1
3
2-6
C28 .005
450Ω
1Ω
V.C.
4~
P.M. SPKR
R13 220K
1
5
7
4
+90V.
RED
117Z3 RECT.
V6
+6V.
R15-1800
R14 1 MEG.
+9V.
118V.
C33 .05
C32 20 MF
R17 2300
R18 1800
C29 40 MF
R16 1500
C31 160 MF.
X
S1 LINE BATT.
RED
RED
BLK
YEL
S2 ON-OFF SW.
C30 20 MF

OUTPUT AND RECTIFIER CIRCUIT
CHASSIS No. RC-1040
(Showing 3Q4 output tube and 117Z3 rectifier tube.)

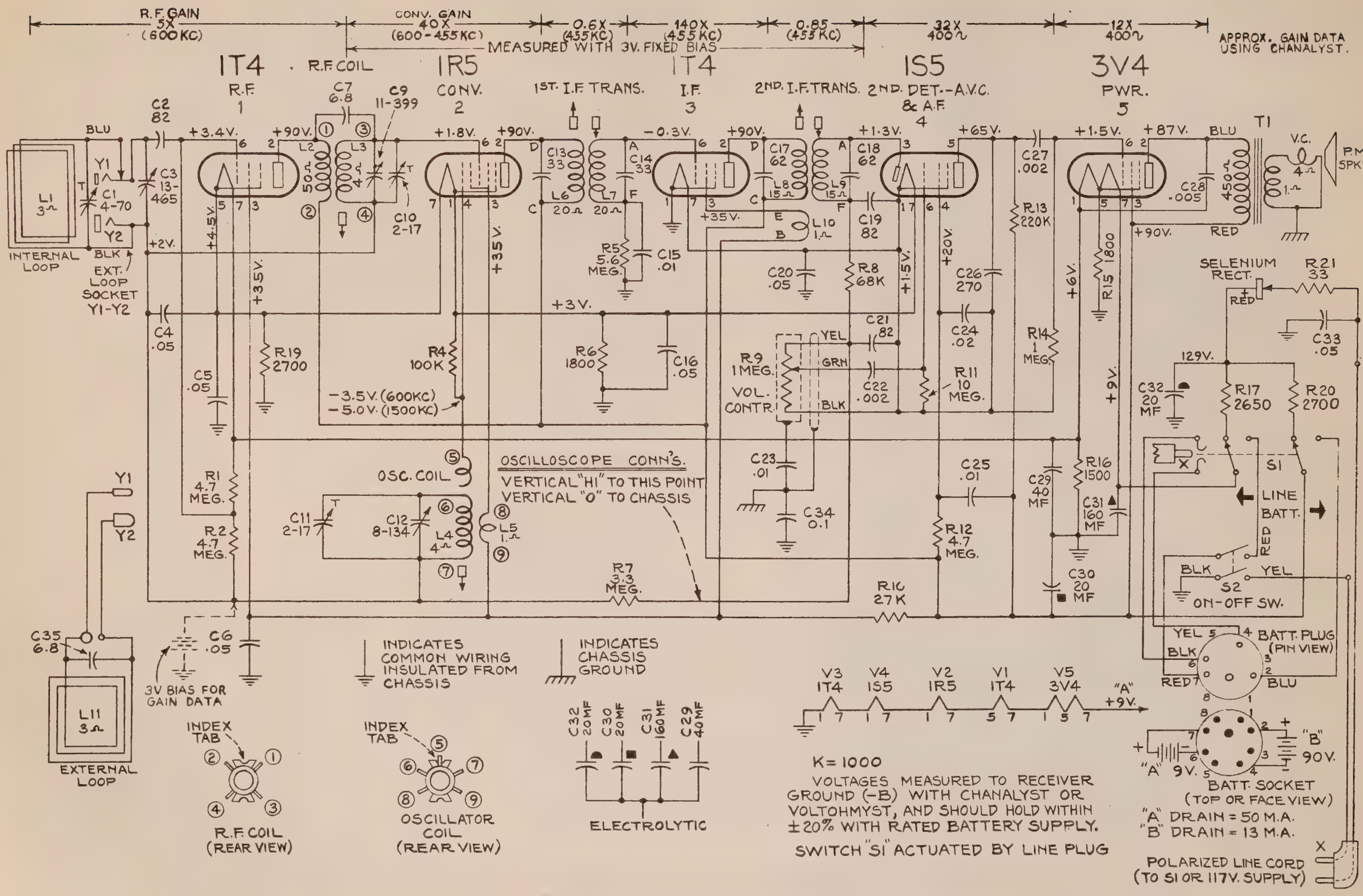
VARIATIONS OF CHASSIS

Chassis No.

RC-1040—Uses 3Q4 output tube and 117Z3 rectifier. C8 and R3 are used in converter input circuit, R17 is 2300 ohms, R18 (1800 ohms) is used.

RC-1040A—Uses 3V4 output tube and 117Z3 rectifier. C8 and R3 omitted, R17 is 2300 ohms, R18 (1800 ohms) is used.

RC-1040B—Uses 3V4 output tube and selenium rectifier. C8 and R3 omitted, R17 is 2650 ohms, R20 (2700 ohms) replaces R18, R21 (33 ohms) is added to rectifier input circuit.


R.F. GAIN 5X (600KC)
CONV. GAIN 40X (600-455KC)
0.6X (455KC)
140X (455KC)
0.85 (455KC)
MEASURED WITH 3V. FIXED BIAS
32X 400~
12X 400~
APPROX. GAIN DATA USING CHANALYST.
1T4 R.F. 1
R.F. COIL
1R5 CONV. 2
1ST. I.F. TRANS.
1T4 I.F. 3
2ND. I.F. TRANS.
1S5 2ND. DET.-A.V.C. & A.F. 4
3V4 PWR. 5
T1
V.C. 4Ω 1Ω
P.M. SPKR
BLU
RED
C2 82
C3 13-465
C1 4-70
L1 3Ω
INTERNAL LOOP
Y1
Y2
BLK
EXT. LOOP SOCKET Y1-Y2
+3.4V.
+90V.
+4.5V.
+3.5V.
+2V.
L2 50Ω
L3 4Ω
C7 6.8
C9 11-399
C10 2-17
+1.8V.
+90V.
+35V.
C13 33
L6 20Ω
L7 20Ω
C14 33
R5 5.6 MEG.
C15 .01
-0.3V.
+90V.
+35V.
C17 62
L8 15Ω
L10 1Ω
C18 62
L9 15Ω
C19 82
R8 68K
C20 .05
+1.3V.
+65V.
+20V.
+1.5V.
C26 270
C24 .02
C27 .002
R13 220K
R14 1 MEG.
+1.5V.
+87V.
+6V.
R15 1800
C28 .005
450Ω
+90V.
+9V.
SELENIUM RECT.
RED
R21 33
C33 .05
129V.
C32 20 MF
R17 2650
R20 2700
S1
LINE
BATT.
RED
BLK
YEL
S2
ON-OFF SW.
C4 .05
C5 .05
R19 2700
+3V.
R4 100K
-3.5V. (600KC)
-5.0V. (1500KC)
R6 1800
C16 .05
R9 1 MEG. VOL. CONTR.
YEL
GRN
BLK
C21 82
C22 .002
R11 10 MEG.
C23 .01
C34 0.1
C25 .01
R12 4.7 MEG.
C29 40 MF
R16 1500
C31 160 MF
C30 20 MF
R1 4.7 MEG.
R2 4.7 MEG.
OSC. COIL
C11 2-17
C12 8-134
L4 4Ω
L5 1Ω
OSCILLOSCOPE CONN'S.
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS
R7 3.3 MEG.
R10 27K
C35 6.8
L11 3Ω
EXTERNAL LOOP
C6 .05
3V BIAS FOR GAIN DATA
INDICATES COMMON WIRING INSULATED FROM CHASSIS
INDICATES CHASSIS GROUND
INDEX TAB
R.F. COIL (REAR VIEW)
OSCILLATOR COIL (REAR VIEW)
C32 20MF
C30 20MF
C31 160MF
C29 40MF
ELECTROLYTIC
V3 1T4
V4 1S5
V2 1R5
V1 1T4
V5 3V4
"A" +9V.
YEL
BLK
RED
BATT. PLUG (PIN VIEW)
BLU
"A" 9V.
"B" 90V.
BATT. SOCKET (TOP OR FACE VIEW)
"A" DRAIN = 50 M.A.
"B" DRAIN = 13 M.A.
X
POLARIZED LINE CORD (TO S1 OR 117V. SUPPLY)
K= 1000
VOLTAGES MEASURED TO RECEIVER GROUND (-B) WITH CHANALYST OR VOLTOHMYST, AND SHOULD HOLD WITHIN ±20% WITH RATED BATTERY SUPPLY.
SWITCH "S1" ACTUATED BY LINE PLUG

SCHEMATIC DIAGRAM CHASSIS No. RC-1040B

R17 is 2400 ohms in some sets—A 22,000 ohm resistor may be in parallel with R17 (2650 ohms). A resistor R17A has been added. See following page for details.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1040, RC-1040A, RC-1040B
71056	Bracket—Drive cord pulley bracket complete with one (1) pulley
71054	Bracket—Drive cord pulley bracket complete with two (2) pulleys
71044	Bracket—Power switch bracket complete with actuating lever less power switch
71042	Button—Plug button
39043	Capacitor—Ceramic, 6.8 mmf. (C7)
71514	Capacitor—Ceramic, 82 mmf. (C2, C8, C19, C21)
71540	Capacitor—Ceramic, 270 mmf. (C26)
71552	Capacitor—Tubular, .002 mfd., 400 volts (C22, C27)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C28)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C15, C23, C25)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C24)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C4, C6, C33)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C5, C16, C20)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C34)
71043	Capacitor—Electrolytic comprising 2 sections of 20 mfd., 150 volts, 1 section of 160 mfd., 25 volts and 1 section of 40 mfd., 25 volts (C29, C30, C31, C32)
71053	Clip—Spring clip for knob
71401	Coil—Oscillator coil (L4, L5)
71402	Coil—R.F. Coil (L2, L3)
71035	Condenser—Variable tuning condenser (C3, C9, C10, C11, C12)
71057	Control—Volume control (R9)
32634	Cord—Drive cord (approx. 37″ overall length)
70022	Cord—Power cord
71048	Dial—Dial scale and window assembly
71036	Drum—Drive drum
72283	Grommet—Rubber grommet to mount tuning capacitor (4 required)
71031	Holder—Power cord holder
71030	Indicator—Station selector indicator
71032	Insulator—Rectangular bakelite insulator—between chassis base and dial support bracket (2 required)
71052	Knob—Tuning knob and volume control knob
18469	Plate—Electrolytic capacitor mounting plate
71041	Plug—4 prong male plug for battery cable
36230	Pulley—Drive cord pulley
72543	Rectifier—Selenium rectifier
71290	Resistor—33 ohms, 1 watt (R21, RC-1040B)
30654	Resistor—1500 ohms, ¼ watt (R16)
30930	Resistor—1800 ohms, ¼ watt (R6, R15)
38875	Resistor—1800 ohms, 1 watt (R18)
71038	Resistor—Ballast resistor, 2300 ohms, 6 watt (R17, RC-1040, RC-1040A)
72760	Resistor—Ballast resistor, 2650 ohms, 7 watt (R17, RC-1040B)
30730	Resistor—2700 ohms, ¼ watt (R19)
14421	Resistor—2700 ohms, 1 watt (R20, RC-1040B)
30409	Resistor—27,000 ohms, ¼ watt (R10)
14138	Resistor—68,000 ohms, ¼ watt (R8)
3252	Resistor—100,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R13)
30652	Resistor—1 megohm, ¼ watt (R14)
30649	Resistor—2.2 megohms, ¼ watt (R3, RC-1040)
31417	Resistor—3.3 megohms, ¼ watt (R7)
30931	Resistor—4.7 megohms, ¼ watt (R1, R2, R12)
31455	Resistor—5.6 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R11)
71055	Shaft—Tuning knob shaft
71050	Shield—L.H. end shield for dial
71051	Shield—R.H. end shield for dial
71040	Socket—2 contact female socket for external loop
71037	Socket—Tube socket—miniature—7 prong—floating
71827	Socket—Tube socket—miniature—7 prong—bottom mounted —without shield
72541	Socket—Tube socket—miniature—7 prong—bottom mounted —with shield
70390	Spring—Drive cord spring
71053	Spring—Retaining spring for knob
71039	Switch—Line—battery change switch (S1)
71045	Switch—Power switch (S2)
71399	Transformer—First I.F. transformer (L6, L7, C13, C14)
71400	Transformer—Second I.F. transformer (L8, L9, L10, C17, C18)
71047	Transformer—Output transformer (T1)
71081	Washer—"C" washer for tuning knob shaft
71033	Washer—Insulating washer, extruded, for mounting dial support to chassis base (4 req'd.) and to mount base holder bracket
71034	Washer—Insulating washer—flat, to mount base holder bracket
71049	Window—Dial window
	SPEAKER ASSEMBLY 922258-2
71059	Gasket—Speaker gasket (black tubing)
71058	Speaker—4″ x 6″ P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71074	Arm—Shutter arm lever
71060	Back—Case back complete with center strip
71617	Cable—Connecting cable for external loop
71069	Capacitor—Adjustable trimmer, 3-35 mmf. (C1)
71080	Clip—Case side spring clip and screw (2 req'd.)
71619	Cup—Suction cup for mounting external loop
71061	Foot—Sliding case foot (moulded) for rear cover—2 req'd.
71068	Foot—Case foot (moulded) for front section of case—2 req'd.
71067	Front—Case front complete less shutter
71618	Gasket—Gasket seal to hold loop together
71063	Handle—Carrying handle
71062	Latch—Case latch (2 req'd.)
71065	Link—Carrying handle link (2 req'd.)
71616	Loop—External antenna loop (L11, C35)
71079	Loop—Antenna loop—internal (L1)
71064	Retainer—Battery retainer spring bracket (2 required)
71066	Screw—#8-32 x 5/16″ long screw to fasten case together (2 required) for battery holders (2 required)
71077	Screw—Screw complete with washer and nut to secure one side to case front or case latch
71071	Shutter—Case shutter
71076	Side—Case side—L.H. with decorative ribs at top and bottom only
71075	Side—Case side—R.H. (loop side)—less capacitor assembly with decorative ribs at top and bottom only
72980	Side—Case side—L.H. with decorative ribs at top, bottom and both sides
72979	Side—Case side—R.H. (loop side) less capacitor assembly with decorative ribs at top, bottom and both sides.
71072	Spring—Case shutter compression spring
31608	Washer—"C" washer for case shutter's shafts
71078	Washer—Dampening washer for shutter shafts

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Change in Battery Plug:

Late production of Model 66BX has a jumper connected between terminals #4 and #6 of the battery plug. In such cases the YELLOW wire of the battery cable is omitted.

Caution in Tube Replacement:

Before replacing any tube, place the power cord in position for battery operation and turn the set on. In addition, if batteries are not connected, short circuit pins #6 (black) and #7 (red) of the battery plug. This prevents possible burnout of tubes due to the discharge of C31 (becomes charged to a high voltage on A.C. operation if filament circuit is not complete). Late production has a resistor, 15,000 ohms (some may be 10,000 ohms), connected between the low voltage side of R17 and the common insulated negative wiring.

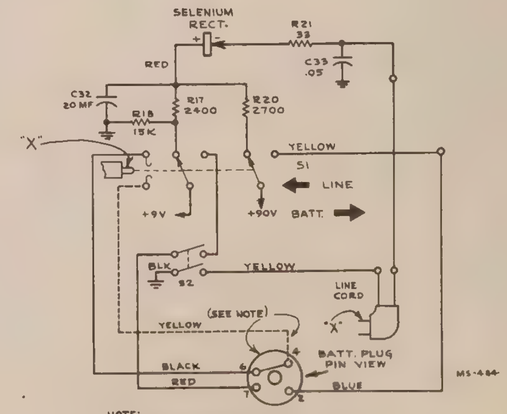
Change in Resistor—Chassis RC-1040B:

Resistor R17 originally 2650 ohms has been changed to 2400 ohms. Some instruments may be found with a 22,000 ohm 1 watt resistor in parallel with R17 (2650 ohms). Resistor R17 is a filament voltage dropping resistor and if its resistance is too great the receiver may fail to operate on low line voltages.

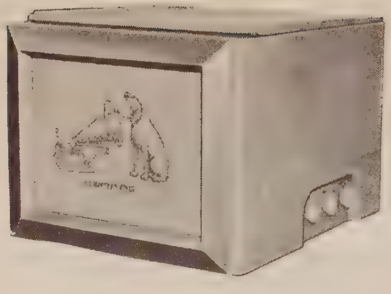
Change in Parts List:

CHASSIS ASSEMBLIES

Stock No. 71041 is a 5 prong male plug for battery cable—the service note description is incorrect in listing it as a 4 prong plug.



NOTE:
YELLOW WIRE OMITTED WHEN JUMPER IS USED BETWEEN TERM. #4 AND #6 OF BATTERY PLUG.



RCA VICTOR

MODEL 66E

Victrola

Chassis No. RS-126—Mfr. No. 274

SERVICE DATA

—1946 No. 11—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tube Complement

(1) RCA-6J5	1st Audio Amplifier
(2) RCA-6SQ7	2nd Audio Amplifier
(3) RCA-6SQ7	Phase Inverter
(4) RCA-6K6GT	Power Output
(5) RCA-6K6GT	Power Output
(6) RCA-5Y3GT	Rectifier

Power Supply Rating

105-125 volts AC, 60 cycles....................100 watts

This instrument can be converted to 50 cycle operation by using motor stamped L230270 (Stock No. 71960) and Stock No. 72533 Spring.

Loudspeaker (92569)

Type	Twelve-inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

Motor Board

Motor	Shaded Pole Self-starting
Turntable speed	78 RPM

Pickup.....Crystal (Low noise, low voltage, sapphire point)

Cabinet Dimensions

Height 14⅛″........Width 18½″..........Depth 20⅝″

Pilot Lamps

(2) Mazda 55 (Control and compartment lamp)	6-8 volts
(1) Mazda 51 (Pilot lamp)	6-8 volts

Power Output

Undistorted....................................7 watts

Replacement Parts

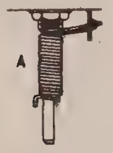
STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLY
71294	Arm—Pickup arm only less cable and crystal
70332	Crystal—Pickup crystal cartridge complete with sapphire
31048	Plug—Pin plug for pickup cable
38449	Sapphire—Sapphire and holder assembly
	MOTOR ASSEMBLIES Stamped L230270
71328	Grommet—Rubber grommet to mount motor (3 required)
71960	Motor—117 volt 60 cycle motor complete with mounting plate
71412	Spring—Idler wheel tension spring
72533	Spring—Spring to convert 60 cycle motor stamped L230270 to 50 cycle operation
71411	Wheel—Idler wheel
	MOTOR ASSEMBLIES Stamped L230200
71414	Spring—Idler wheel tension spring
71413	Wheel—Idler wheel for motor L230200
	MOTORBOARD ASSEMBLIES
72204	Bearing—Turntable spindle bearing and plate
72209	Escutcheon—"On-Off" escutcheon
72207	Lever—Tone arm lever
72202	Motorboard—Motorboard only
30870	Plug—2 prong male plug for power cable
72208	Rest—Pickup arm rest
72205	Spindle—Turntable spindle
72203	Switch—"On-Off" switch (S2)
72206	Turntable—Finished turntable plate
71292	Washer—Retaining "C" washer for turntable
	POWER AMPLIFIER ASSEMBLY RS126
4287	Body—Connector body for lamp socket cable (chassis end)
4288	Cap—Connector cap for lamp socket cable
39646	Capacitor—Mica, 560 mmf. (C3, C13)
70646	Capacitor—Tubular, .0035 mfd. (C14, C15)
70604	Capacitor—Tubular, .0035 mfd. (C11)
70606	Capacitor—Tubular, .005 mfd. (C2, C7)
71135	Capacitor—Tubular, .015 mfd. (C8)
70610	Capacitor—Tubular, .01 mfd. (C6, C9, C12)
70611	Capacitor—Tubular, .02 mfd. (C10)
38233	Capacitor—Electrolytic, comprising one (1) section of 20 mfd., 350 volts, and two (2) sections of 20 mfd., 25 volts (C4B, C4C)
71976	Capacitor—Electrolytic comprising 1 section of 20 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 20 mfd., 25 volts (C5A, C5B, C5C)
38405	Control—H.F. tone control (R14)
38402	Control—L.F. tone control and power switch (R15, S1)
71980	Control—Volume control (R10)
70392	Cord—Power cord
4286	Ferrule—Bushing and ferrule for lamp socket cable
71851	Grommet—Rubber grommet
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
72325	Resistor—390 ohms, 2 watt (R19)
30930	Resistor—1800 ohms, ½ watt (R3)
30730	Resistor—2700 ohms, ½ watt (R11)
8097	Resistor—5600 ohms, 2 watts (R20)
14250	Resistor—8200 ohms, ½ watt (R17)
36714	Resistor—15,000 ohms, ½ watt (R6)
3219	Resistor—18,000 ohms, ½ watt (R5)
30492	Resistor—22,000 ohms, ½ watt (R1, R7)
30409	Resistor—27,000 ohms, ½ watt (R8)
30147	Resistor—39,000 ohms, ½ watt (R4)
3252	Resistor—100,000 ohms, ½ watt (R2)
30651	Resistor—270,000 ohms, ½ watt (R9, R13, R21)
30648	Resistor—470,000 ohms, ½ watt (R16, R18)
30652	Resistor—1 megohm, ½ watt (R12)
35787	Socket—Phono input socket
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket—wafer
31319	Socket—Tube socket—moulded
4284	Spring—Connector body spring (chassis end)
71979	Stop—Volume control stop
71975	Transformer—Power transformer, 117 volts, 60 cycle (T1)
4285	Washer—Insulating washer for connector body
	SPEAKER ASSEMBLIES 92569-1W 92569-3W
13867	Cap—Dust cap
36145	Cone—Cone complete with voice coil
71560	Plug—5-prong male plug for speaker
71961	Speaker—12″ P.M. speaker complete with cone and voice coil less output transformer and plug.
37899	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71977	Bracket—Bracket for motorboard compartment lamp
13103	Cap—Pilot lamp jewel
71978	Cover—Compartment lamp lead cover
72116	Decal—Control panel decal
72115	Decal—Trade mark decal—"RCA-Victor"
71966	Decal—Trade mark decal—"Victrola"
72113	Feet—Rubber feet (4 required)
72112	Grille—Grille cloth and wire screen
72105	Hinge—Cabinet lid hinge (2 required)
70474	Knob—Control knob (ivory)
5117	Lamp—Control and compartment lamp—Mazda 55
11765	Lamp—Pilot lamp—Mazda 51
70546	Mounting—Motorboard mounting hardware (1 set) consisting of four (4) upper springs, four (4) lower springs and four (4) clamp nuts
37800	Shade—Lamp shade for motorboard compartment lamp
72114	Spring—Anti-noise spring
30900	Spring—Retaining spring for knobs
72110	Support—Lid support

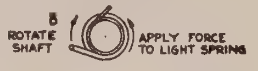
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Adjustment of Volume Control Lock

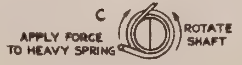
This instrument is provided with a volume control lock to provide a pre-determined "maximum" volume level and yet permit normal volume control operation up to the pre-determined "maximum". This "maximum" can be readily adjusted following the procedure described below.

1. With the instrument in operation turn the volume control full clockwise and remove the volume control knob. The ends of two springs (of different weights) on the volume control shaft (see sketch "A") can be seen through the opening in the cabinet.
2. To INCREASE desired "maximum" volume level—
   - (a) Apply just enough force (to unlock volume control shaft) with the eraser end of a pencil, on the end of the light weight spring, in direction indicated in sketch "B"



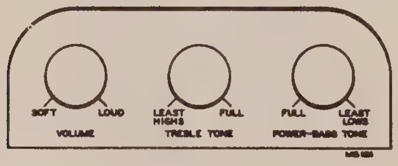

B
ROTATE SHAFT
APPLY FORCE TO LIGHT SPRING

   - (b) Rotate volume control shaft in direction indicated until desired level is reached.
   - (c) Releasing force on spring automatically locks control so it can be operated from zero to the level where it has been locked.
3. To DECREASE desired "maximum" volume level—
   - (a) Apply force with the eraser end of a pencil on the heavy weight spring as indicated in sketch "C".


C
APPLY FORCE TO HEAVY SPRING
ROTATE SHAFT

   - (b) Rotate to a very low level, then proceed as in step 2.

NOTE: The procedure in step (3b) is necessary to prevent possible error that may be introduced due to backlash.


SOFT
LOUD
VOLUME
LEAST HIGHS
FULL
TREBLE TONE
FULL
LEAST LOWS
POWER-BASS TONE

Controls

In some instruments the color of the BLACK-RED wire of the speaker cable may be RED.

Vibration of Lid Hold

A small piece of spring material is fastened on the inside of the cabinet in such a position as to apply force against the lid hold and keep it from vibrating when the lid is closed.

When servicing the instrument, make certain this spring is in position and serving its purpose.

Lubrication

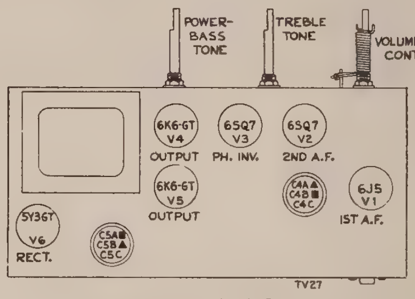
The bearings of the motors furnished in these instruments are lubricated at the factory and should require no further lubrication for a period of at least one year. When lubrication is required, apply a few drops of any good grade of S.A.E. No. 10 oil to the bearing felts.

CAUTION:

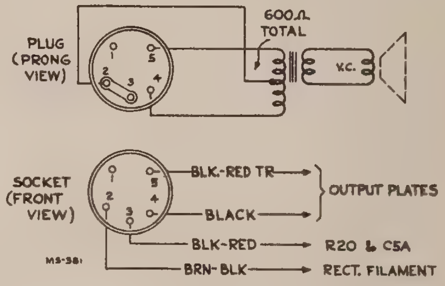
Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.

Critical Lead Dress

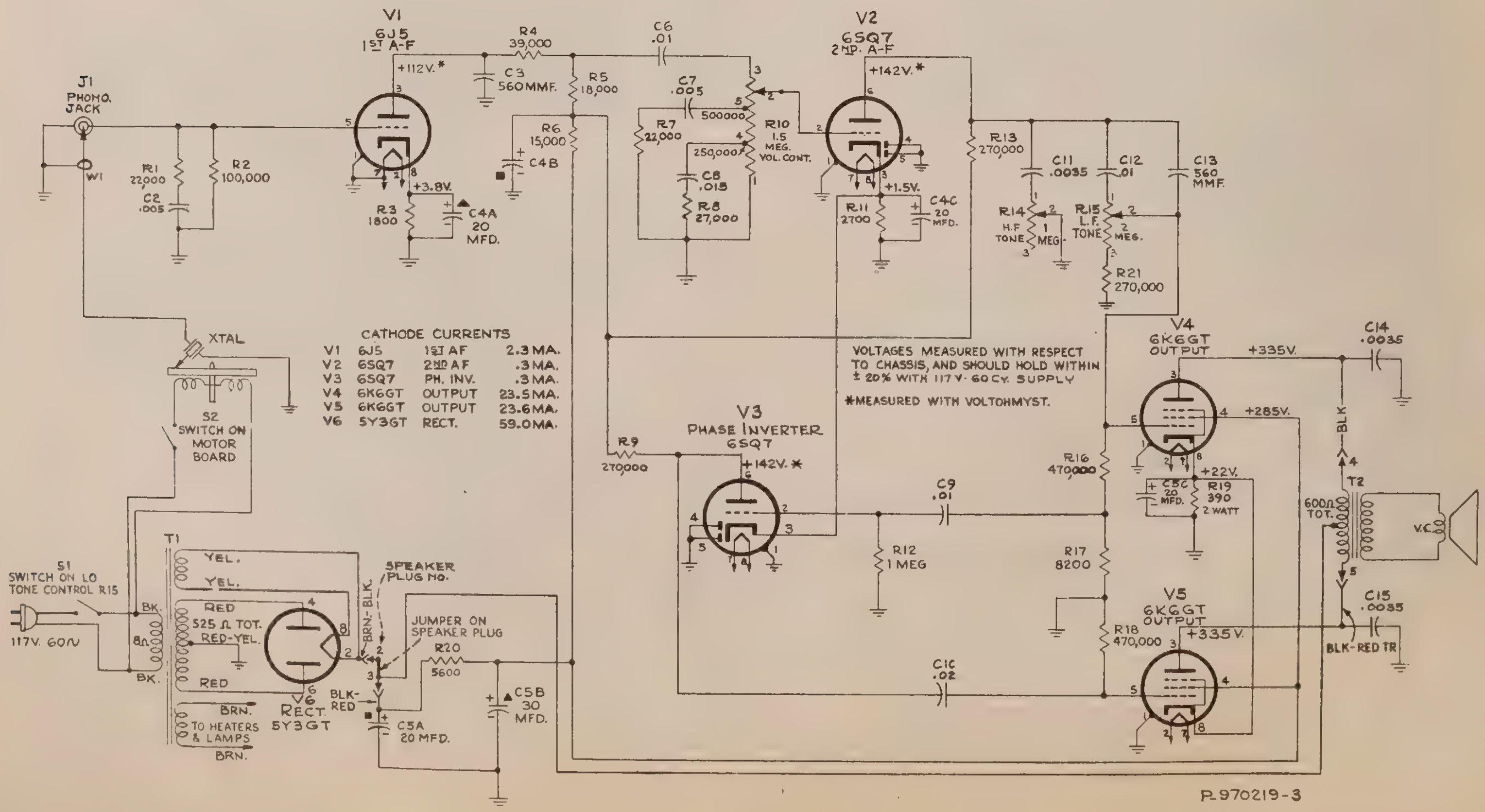
1. All leads and parts connected to the 6J5 socket should have sufficient slack to insure flexibility of socket.
2. The green lead from the center terminal of R10 volume control to terminal No. 2 of the 6SQ7 socket should be dressed up and away from all other leads and parts.
3. The lead from pin No. 5 of the 6J5 socket to the phono jack should be dressed up and away from all other leads and parts.


POWER-BASS TONE
TREBLE TONE
VOLUME CONT.
6K6-GT V4 OUTPUT
6SQ7 V3 PH. INV.
6SQ7 V2 2ND A.F.
6K6-GT V5 OUTPUT
C4A C4B C4C
6J5 V1 1ST A.F.
5Y3GT V6 RECT.
C5A C5B C5C
TV27

Location of Tubes


PLUG (PRONG VIEW)
1
2
3
4
5
600Ω TOTAL
V.C.
SOCKET (FRONT VIEW)
BLK.-RED TR.
OUTPUT PLATES
BLACK
BLK.-RED
R20 & C5A
BRN.-BLK.
RECT. FILAMENT
MS-381

Speaker Connections


V1
6J5
1ST A-F
+112V.*
J1
PHONO. JACK
W1
R1 22,000
C2 .005
R2 100,000
R3 1800
+3.8V.
C4A 20 MFD.
R4 39,000
C3 560 MMF.
R5 18,000
R6 15,000
C4B
C6 .01
C7 .005
R7 22,000
500000
250,000
C8 .015
R8 27,000
R10 1.5 MEG. VOL. CONT.
V2
6SQ7
2ND A-F
+142V.*
+1.5V.
R11 2700
C4C 20 MFD.
R13 270,000
C11 .0035
C12 .01
C13 560 MMF.
R14 H.F. TONE 1 MEG
R15 L.F. TONE 2 MEG.
R21 270,000
XTAL
S2 SWITCH ON MOTOR BOARD
R9 270,000
V3
PHASE INVERTER
6SQ7
+142V.*
C9 .01
R12 1 MEG
V4
6K6GT
OUTPUT
+335V.
+285V.
C14 .0035
R16 470,000
C5C 20 MFD.
+22V.
R19 390 2 WATT
R17 8200
BLK
T2
600Ω TOT.
V.C.
C15 .0035
V5
6K6GT
OUTPUT
+335V.
R18 470,000
C1C .02
BLK-RED TR
S1 SWITCH ON LO TONE CONTROL R15
117V. 60∿
T1
BK.
YEL.
YEL.
RED
525 Ω TOT.
RED-YEL.
RED
BRN.
TO HEATERS & LAMPS
BRN.
8Ω
V6
RECT.
5Y3GT
SPEAKER PLUG NO.
BRN.-BLK.
JUMPER ON SPEAKER PLUG
R20 5600
BLK-RED
C5A 20 MFD.
C5B 30 MFD.
P-970219-3

CATHODE CURRENTS

V1	6J5	1ST AF	2.3 MA.
V2	6SQ7	2ND AF	.3 MA.
V3	6SQ7	PH. INV.	.3 MA.
V4	6K6GT	OUTPUT	23.5 MA.
V5	6K6GT	OUTPUT	23.6 MA.
V6	5Y3GT	RECT.	59.0 MA.

VOLTAGES MEASURED WITH RESPECT TO CHASSIS, AND SHOULD HOLD WITHIN ± 20% WITH 117 V. 60 CY. SUPPLY

*MEASURED WITH VOLTOHMYST.

RCA MODEL 66E-1

Chassis No. RS-126—Mfr. No. 274

Service Data

1946 . . . . X6

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Tube Complement

(1) RCA-6J5	1st Audio Amplifier
(2) RCA-6SQ7	2nd Audio Amplifier
(3) RCA-6SQ7	Phase Inverter
(4) RCA-6K6GT	Power Output
(5) RCA-6K6GT	Power Output
(6) RCA-5Y3GT	Rectifier

Power Supply Rating

105-125 volts AC, 60 cycles . . . . 100 watts

This instrument can be converted to 50 cycle operation by using motor stamped L230270 (Stock No. 71960) and Stock No. 72533 Spring.

Loudspeaker (92569)

Type	Twelve-inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

Motor Board

Motor	Shaded Pole Self-starting
Turntable speed	78 RPM

Pickup . . . . Crystal (Low noise, low voltage, sapphire point)

Cabinet Dimensions

Height 14⅛" . . . . Width 18½" . . . . Depth 20⅝"

Pilot Lamps

(2) Mazda 55 (Control and compartment lamp)	6-8 volts
(1) Mazda 51 (Pilot lamp)	6-8 volts

Power Output

Undistorted . . . . 7 watts

Replacement Parts

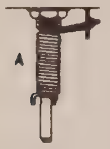
STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLY
71294	Arm—Pickup arm only less cable and crystal
70332	Crystal—Pickup crystal cartridge complete with sapphire
31048	Plug—Pin plug for pickup cable
38449	Sapphire—Sapphire and holder assembly
	MOTOR ASSEMBLIES Stamped L230270
71328	Grommet—Rubber grommet to mount motor (3 required)
71960	Motor—117 volt 60 cycle motor complete with mounting plate
71412	Spring—Idler wheel tension spring
72533	Spring—Spring to convert 60 cycle motor stamped L230270 to 50 cycle operation
71411	Wheel—Idler wheel
	MOTOR ASSEMBLIES Stamped L230200
71414	Spring—Idler wheel tension spring
71413	Wheel—Idler wheel for motor L230200
	MOTORBOARD ASSEMBLIES
72204	Bearing—Turntable spindle bearing and plate
72209	Escutcheon—"On-Off" escutcheon
72207	Lever—Tone arm lever
72202	Motorboard—Motorboard only
30870	Plug—2 prong male plug for power cable
72208	Rest—Pickup arm rest
72205	Spindle—Turntable spindle
72203	Switch—"On-Off" switch (S2)
72206	Turntable—Finished turntable plate
71292	Washer—Retaining "C" washer for turntable
	POWER AMPLIFIER ASSEMBLY RS126
4287	Body—Connector body for lamp socket cable (chassis end)
4288	Cap—Connector cap for lamp socket cable
39646	Capacitor—Mica, 560 mmf. (C3, C13)
70646	Capacitor—Tubular, .0035 mfd. (C14, C15)
70604	Capacitor—Tubular, .0035 mfd. (C11)
70606	Capacitor—Tubular, .005 mfd. (C2, C7)
71135	Capacitor—Tubular, .015 mfd. (C8)
70610	Capacitor—Tubular, .01 mfd. (C6, C9, C12)
70611	Capacitor—Tubular, .02 mfd. (C10)
38233	Capacitor—Electrolytic, comprising one (1) section of 20 mfd., 350 volts, and two (2) sections of 20 mfd., 25 volts (C4B, C4C)
71976	Capacitor—Electrolytic comprising 1 section of 20 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 20 mfd., 25 volts (C5A, C5B, C5C)
38405	Control—H.F. tone control (R14)
38402	Control—L.F. tone control and power switch (R15, S1)
71980	Control—Volume control (R10)
70392	Cord—Power cord
4286	Ferrule—Bushing and ferrule for lamp socket cable
71851	Grommet—Rubber grommet
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
72325	Resistor—390 ohms, 2 watt (R19)
30930	Resistor—1800 ohms, ½ watt (R3)
30730	Resistor—2700 ohms, ½ watt (R11)
8097	Resistor—5600 ohms, 2 watts (R20)
14250	Resistor—8200 ohms, ½ watt (R17)
36714	Resistor—15,000 ohms, ½ watt (R6)
3219	Resistor—18,000 ohms, ½ watt (R5)
30492	Resistor—22,000 ohms, ½ watt (R1, R7)
30409	Resistor—27,000 ohms, ½ watt (R8)
30147	Resistor—39,000 ohms, ½ watt (R4)
3252	Resistor—100,000 ohms, ½ watt (R2)
30651	Resistor—270,000 ohms, ½ watt (R9, R13, R21)
30648	Resistor—470,000 ohms, ½ watt (R16, R18)
30652	Resistor—1 megohm, ½ watt (R12)
35787	Socket—Phono input socket
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket—wafer
31319	Socket—Tube socket—moulded
4284	Spring—Connector body spring (chassis end)
71979	Stop—Volume control stop
71975	Transformer—Power transformer, 117 volts, 60 cycle (T1)
4285	Washer—Insulating washer for connector body
	SPEAKER ASSEMBLIES 92569-1W 92569-3W
13867	Cap—Dust cap
36145	Cone—Cone complete with voice coil
71560	Plug—5-prong male plug for speaker
71961	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug.
37899	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71977	Bracket—Bracket for motorboard compartment lamp
13103	Cap—Pilot lamp jewel
71978	Cover—Compartment lamp lead cover
72116	Decal—Control panel decal
72113	Feet—Rubber feet (4 required)
72111	Grille—Grille cloth and wire screen
72105	Hinge—Cabinet lid hinge (2 required)
70474	Knob—Control knob
5117	Lamp—Control and compartment lamp—Mazda 55
11765	Lamp—Pilot lamp—Mazda 51
70546	Mounting—Motorboard mounting hardware (1 set) consisting of four (4) upper springs, four (4) lower springs and four (4) clamp nuts
37800	Shade—Lamp shade for motorboard compartment lamp
72114	Spring—Anti-noise spring
30900	Spring—Retaining spring for knobs
72110	Support—Lid support

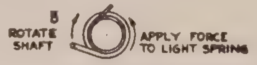
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Adjustment of Volume Control Lock

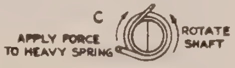
This instrument is provided with a volume control lock to provide a pre-determined "maximum" volume level and yet permit normal volume control operation up to the pre-determined "maximum". This "maximum" can be readily adjusted following the procedure described below.

1. With the instrument in operation turn the volume control full clockwise and remove the volume control knob. The ends of two springs (of different weights) on the volume control shaft (see sketch "A") can be seen through the opening in the cabinet.
2. To INCREASE desired "maximum" volume level—
   (a) Apply just enough force (to unlock volume control shaft) with the eraser end of a pencil, on the end of the light weight spring, in direction indicated in sketch "B"




B
ROTATE SHAFT
APPLY FORCE TO LIGHT SPRING

   (b) Rotate volume control shaft in direction indicated until desired level is reached.
   (c) Releasing force on spring automatically locks control so it can be operated from zero to the level where it has been locked.
3. To DECREASE desired "maximum" volume level—
   (a) Apply force with the eraser end of a pencil on the heavy weight spring as indicated in sketch "C".


C
APPLY FORCE TO HEAVY SPRING
ROTATE SHAFT

   (b) Rotate to a very low level, then proceed as in step 2.

NOTE: The procedure in step (3b) is necessary to prevent possible error that may be introduced due to backlash.

Vibration of Lid Hold

A small piece of spring material is fastened on the inside of the cabinet in such a position as to apply force against the lid hold and keep it from vibrating when the lid is closed.

When servicing the instrument, make certain this spring is in position and serving its purpose.

Lubrication

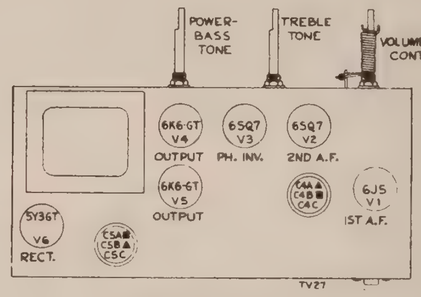
The bearings of the motors furnished in these instruments are lubricated at the factory and should require no further lubrication for a period of at least one year. When lubrication is required, apply a few drops of any good grade of S.A.E. No. 10 oil to the bearing felts.

CAUTION:

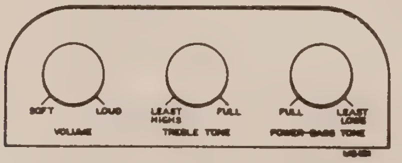
Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.

Critical Lead Dress

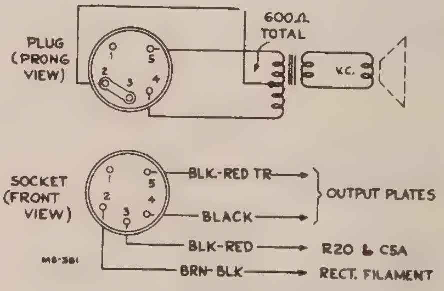
1. All leads and parts connected to the 6J5 socket should have sufficient slack to insure flexibility of socket.
2. The green lead from the center terminal of R10 volume control to terminal No. 2 of the 6SQ7 socket should be dressed up and away from all other leads and parts.
3. The lead from pin No. 5 of the 6J5 socket to the phono jack should be dressed up and away from all other leads and parts.


POWER-BASS TONE
TREBLE TONE
VOLUME CONT.
6K6-GT V4 OUTPUT
6SQ7 V3 PH. INV.
6SQ7 V2 2ND A.F.
6K6-GT V5 OUTPUT
C4A C4B C4C
6J5 V1 1ST A.F.
5Y3GT V6 RECT.
C5A C5B C5C
TV27

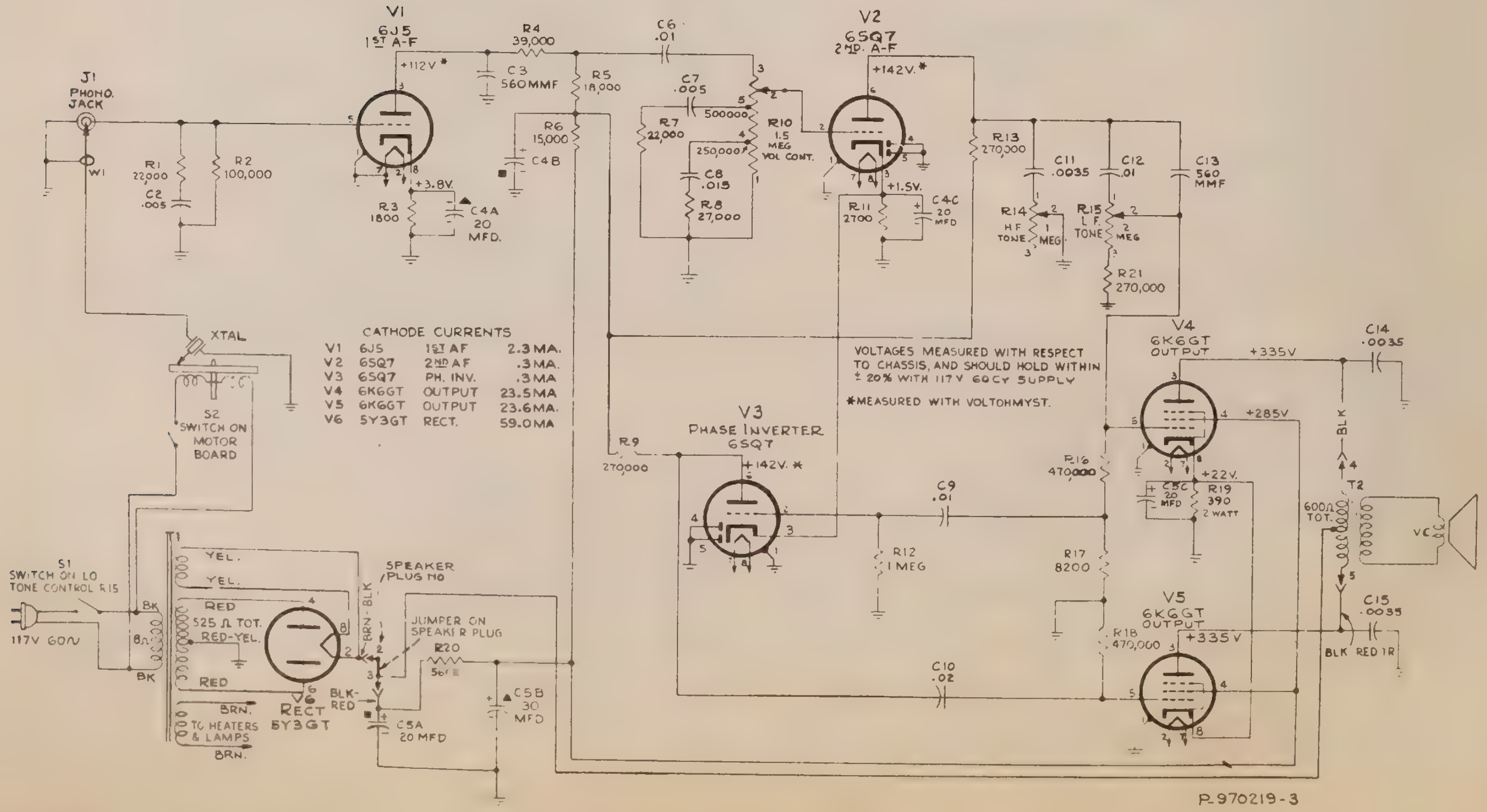
Location of Tubes


SOFT
LOUD
VOLUME
LEAST HIGHS
FULL
TREBLE TONE
FULL
LEAST LOWS
POWER-BASS TONE

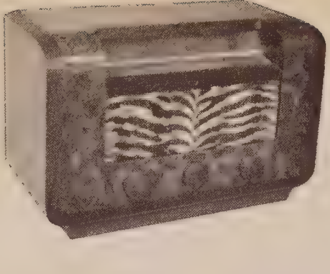
Controls


PLUG (PRONG VIEW)
600Ω TOTAL
V.C.
SOCKET (FRONT VIEW)
BLK.-RED TR
BLACK
OUTPUT PLATES
BLK-RED
R20 & C5A
BRN-BLK
RECT. FILAMENT
MS-381

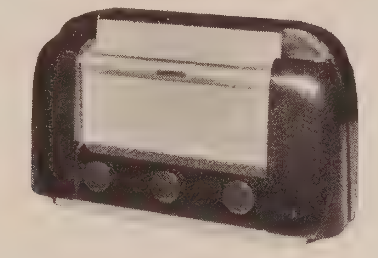
Speaker Connections


V1
6J5
1ST A-F
+112V *
J1
PHONO. JACK
W1
R1 22,000
C2 .005
R2 100,000
R3 1800
+3.8V.
C4A 20 MFD.
R4 39,000
C3 560MMF
R5 18,000
R6 15,000
C4B
C6 .01
C7 .005
500000
R7 22,000
250,000
C8 .015
R8 27,000
R10 1.5 MEG VOL CONT.
V2
6SQ7
2ND. A-F
+142V. *
+1.5V.
R11 2700
C4C 20 MFD
R13 270,000
C11 .0035
C12 .01
C13 560 MMF
R14 H F TONE 1 MEG
R15 L F TONE 2 MEG
R21 270,000
XTAL
S2 SWITCH ON MOTOR BOARD
CATHODE CURRENTS
V1 6J5 1ST AF 2.3MA.
V2 6SQ7 2ND AF .3MA.
V3 6SQ7 PH. INV. .3MA
V4 6K6GT OUTPUT 23.5MA
V5 6K6GT OUTPUT 23.6MA.
V6 5Y3GT RECT. 59.0MA
VOLTAGES MEASURED WITH RESPECT TO CHASSIS, AND SHOULD HOLD WITHIN ± 20% WITH 117V 60CY SUPPLY
*MEASURED WITH VOLTOHMYST.
R9 270,000
V3
PHASE INVERTER
6SQ7
+142V. *
C9 .01
R12 1 MEG
R16 470,000
R17 8200
R18 470,000
C10 .02
V4
6K6GT
OUTPUT
+335V
+285V
+22V.
C5C 20 MFD
R19 390 2 WATT
C14 .0035
BLK
T2
600Ω TOT.
VC
V5
6K6GT
OUTPUT
+335V
C15 .0035
BLK RED TR
S1
SWITCH ON LO TONE CONTROL R15
117V 60~
BK
8Ω
YEL.
YEL.
RED
525 Ω TOT.
RED-YEL.
RED
BRN.
TO HEATERS & LAMPS
BRN.
V6
RECT
5Y3GT
SPEAKER PLUG NO
BRN-BLK
BLK-RED
JUMPER ON SPEAKER PLUG
R20 560
C5A 20 MFD
C5B 30 MFD
P.970219-3

66X7—(Black Plastic)
66X8—(Red Plastic)
66X9—(Black & White Plastic)



66X3—(Wood)



66X1—(Brown Plastic)
66X2—(Ivory Plastic)

RCA VICTOR

MODELS 66X1, 66X2

Chassis No. RC-1038—Mfr. No. 274

MODELS 66X3, 66X7, 66X8, 66X9

Chassis No. RC-1038A—Mfr. No. 274

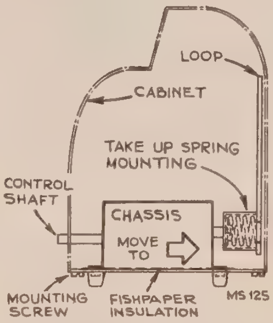
SERVICE DATA

1946..No. 2

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range	
Broadcast	540-1600 kc
Short Wave	9-12 mc
Intermediate Frequency	455 kc
Tube Complement	
(1) RCA-12SG7	R-F Amplifier
(2) RCA-12SA7	1st Det.—Osc.
(3) RCA-12SK7	I-F Amplifier
(4) RCA-12SQ7	2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT	Power Output
(6) RCA-35Z5-GT	Rectifier
Pilot Lamps (2)	Mazda No. 1490, 3.2 volts
Power Output	
Undistorted	1.0 watts
Maximum	1.5 watts
Loudspeaker (922258-2)	
Size	4 x 6″ elliptical P.M
V.C. Impedance	3.4 ohms at 400 cycles
Power Supply Rating	
105-125 volts, AC, 50 or 60 cycles, or DC	27.6 watts



The construction of the cabinets for Models 66X1 and 2 makes it necessary to remove the chassis for replacing tubes. To do this, proceed as follows:

1. Remove the power plug from the service receptacle.
2. Remove control knobs.
3. Remove the six slotted screws around the edge of the metal base plate. (**Do not remove the four feet from the base plate as this will separate the base plate from the chassis**).
4. Tilt the cabinet forward so that the bottom rear edge of the cabinet raises above base plate.
5. Hold the chassis with one hand while pushing the cabinet forward and upward to clear the control shafts.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1038 & RC-1038A
39616	Capacitor—Mica, 33 mmf. (C1)
39622	Capacitor—Mica, 56 mmf. (C4)
71156	Capacitor—Ceramic, 108 mmf. (C21)
71157	Capacitor—Ceramic, 146 mmf. (C27)
71121	Capacitor—Mica trimmer, 180-250 mmt. (C26)
39636	Capacitor—Mica, 220 mmf. (C2)
39640	Capacitor—Mica, 330 mmf. (C9)
71113	Capacitor—Mica trimmer, 400-700 mmf. (C20)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C12)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C15)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C28)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C16)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7, C19)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C29)
70408	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C17, C18)
71405	Coil—Antenna coil (L14)
71406	Coil—Oscillator coil—"A" band (L12, L13)
71408	Coil—Oscillator coil—"C" band (L10, L11)
71407	Coil—Wave trap (L1, L2)
71110	Condenser—Variable tuning condenser (C22, C23, C24, C25)
38410	Control—Volume control and power switch (R6, S1)
34662	Cord—Drive cord (approx. 51″ overall length)
70384	Drum—Drive drum
70391	Insulator—Insulator for phono jack
71114	Indicator—Station selector indicator
71116	Lamp—Dial lamp—Mazda 1490
71117	Loop—Antenna loop (L15, L16)
71108	Plate—Dial back plate complete with four (4) pulleys less dial for models 66X1, 66X2
72753	Plate—Dial back plate complete with four (4) pulleys less dial for models 66X3, , 66X7, 66X8, 66X9
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ½ watt (R9)
6134	Resistor—1200 ohms, 1 watt (R11)
30694	Resistor—3900 ohms, ¼ watt (R1)
30436	Resistor—12,000 ohms, ¼ watt (R13)
30685	Resistor—33,000 ohms, ¼ watt (R3)
30787	Resistor—47,000 ohms, ¼ watt (R12)
14583	Resistor—220,000 ohms, ¼ watt (R2, R4, R8)
30648	Resistor—470,000 ohms, ¼ watt (R10)
31417	Resistor—3.3 megohms, ¼ watt (R5)
30931	Resistor—4.7 megohms, ¼ watt (R7)
70467	Shaft—Tuning knob shaft
71118	Shell—Protecting shell for loop spacing spring (2 required)
71115	Socket—Lamp socket
37605	Socket—Tube socket
71120	Spacer—Tubular spacer to mount antenna loop (2 required)
70390	Spring—Drive cord spring
71119	Spring—Loop assembly spacing spring (2 required)
71112	Switch—Range and tone switch (S2)
71111	Transformer—Output transformer (L7, L8)
71558	Transformer—First I.F. transformer (L3, L4, C5, C6)
70387	Transformer—Second I.F. transformer (L5, L6, C8, C10, C11, C13)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4″ x 6″ elliptical P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71835	Back—Cabinet back for Model 66X3
72514	Back—Cabinet back for 66X7 and 66X9
72721	Back—Cabinet back for 66X8
71122	Baffle—Speaker baffle assembly for 66X1 and 66X2
X1627	Baffle—Baffle board and grill cloth for 66X7, 66X8, 66X9
Y1423	Cabinet—Catalin (black) cabinet for 66X7
Y1408	Cabinet—Catalin (red) cabinet for 66X8
Y1393	Cabinet—Catalin (black and white) cabinet for 66X9
71124	Clamp—Dial clamp for 66X1 and 66X2 (2 required)
71131	Clamp—Dial clamp for 66X3
71132	Dial—Glass dial scale for (66X1, 66X2)
72822	Dial—Glass dial scale for (66X3, 66X7, 66X8, 66X9)
71127	Foot—Cabinet foot—walnut—for 66X1 (4 required)
71128	Foot—Cabinet foot—ivory—for 66X2 (4 required)
72678	Knob—Control knob (black) for 66X7 and 66X9
71821	Knob—Control knob (maroon) for 66X8
70473	Knob—Control knob (mottled walnut) for 66X1, 66X3
70474	Knob—Control knob (ivory) for 66X2
71126	Nut—Speed nut to fasten screen (4 required)
71125	Screen—Protective screen for hand grip for 66X1 and 66X2
72295	Socket—Phono
30900	Spring—Retaining spring for control knobs
71130	Spring—Retaining spring for front strip for 66X1 and 66X2
71129	Strip—Finished strip for cabinet front for 66X1 and 66X2

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a 0.1 mf. capacitor to common "–B." Keep the output signal as low as possible to avoid A.V.C. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum clockwise position, station selector switch to broadcast maximum high position (pos. 2), for broadcast alignment and to position 3 for high frequency band.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator to 2¹⁵⁄₁₆ in. from end of backplate as indicated in drawing.

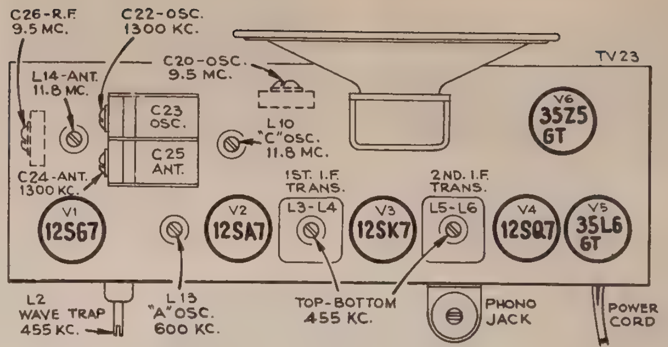
On models 66X1 and 2 the dial indicator is accessible for adjustment by removing the metal strip below the dial glass. (Lift and swing the top forward).

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial back plate.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c. reversal of the plug may reduce hum.

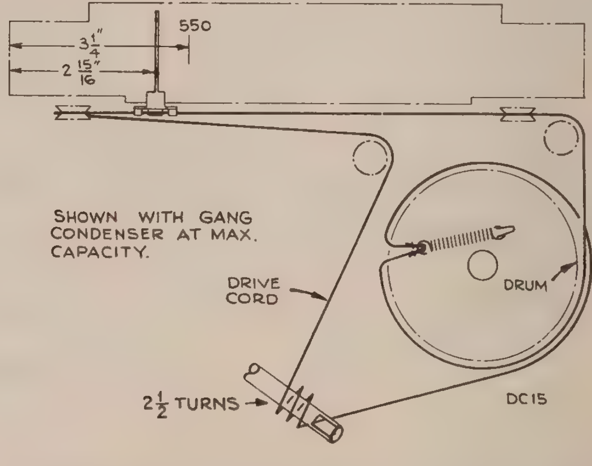
Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Pin #4 (signal grid) 12SK7 IF tube in series with 0.1 mfd.	455 kc	Quiet point at 1600 kc end of the dial	T2† 2nd I.F. trans.
2	Pin #8 (signal grid) 12SA7 1st det. in series with 0.1 mfd.			T1 1st I.F. trans.
3	Antenna in series with 200 mmf.			L2 for minimum output (Wave trap)
4		1300 kc	1300 kc	C22 (osc.) C24 (ant.)
5		600 kc	600 kc	L13 While rocking gang
6	Repeat steps 4 and 5.			
7	Antenna in series with 50 mmf.	9.5 mc.	9.5 mc.	C20 (Osc.)*
8		9.5 mc.	9.5 mc.	C26 Ant. while rocking gang
9		11.8 mc.	11.8 mc.	L10 (Osc.)**
10				L14 while rocking gang
11	Repeat steps 9 and 10.			

*If two peaks are obtained use minimum capacity peak.
**If two peaks are obtained use minimum inductance peak.
†Do not repeat step No. 1.

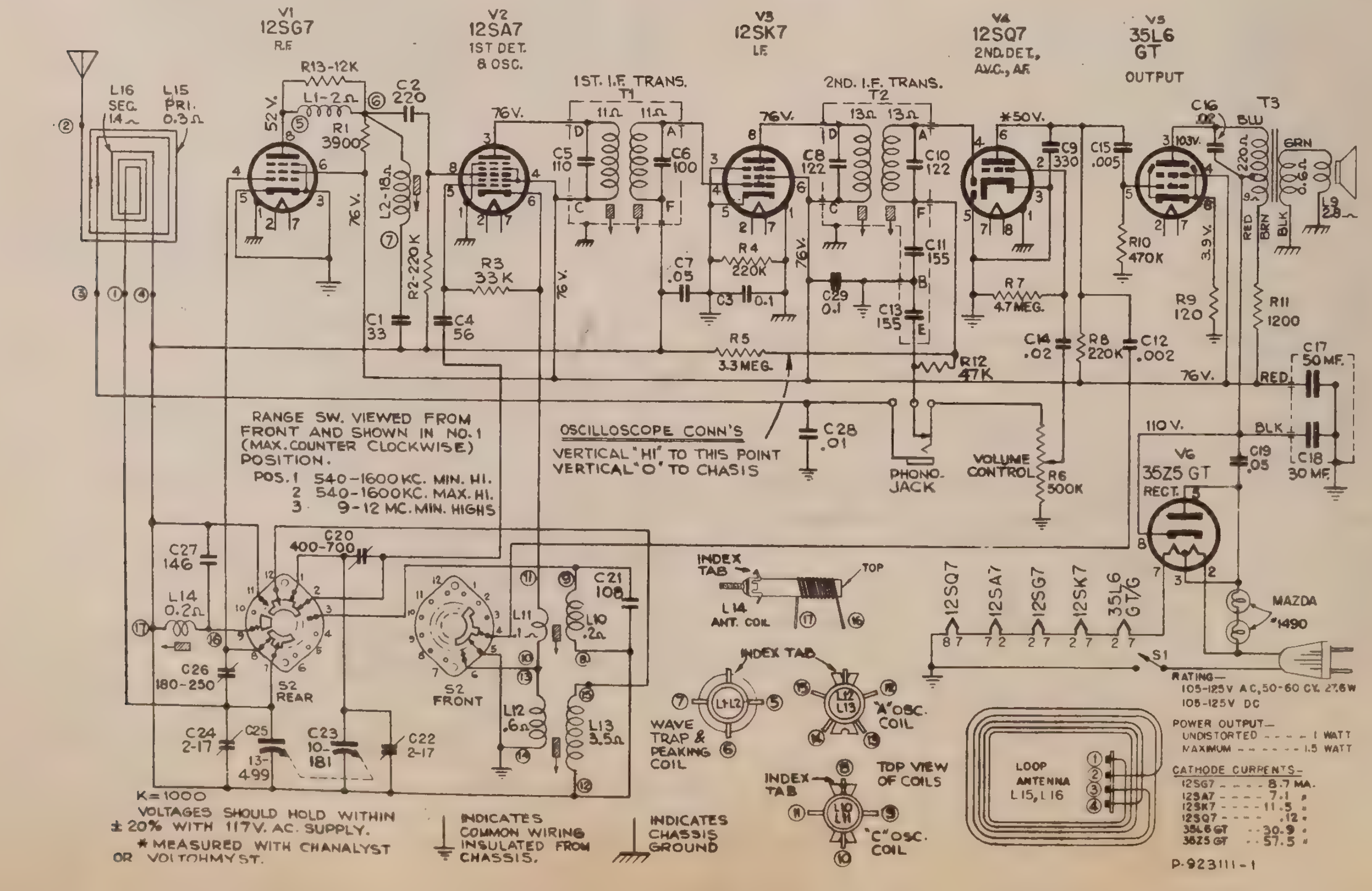

C26-R.F. 9.5 MC.
C22-OSC. 1300 KC.
C20-OSC. 9.5 MC.
TV23
L14-ANT. 11.8 MC.
C23 OSC.
C25 ANT.
L10 "C" OSC. 11.8 MC.
C24-ANT. 1300 KC.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
V6 35Z5 GT
V1 12SG7
V2 12SA7
L3-L4
V3 12SK7
L5-L6
V4 12SQ7
V5 35L6 GT
L2 WAVE TRAP 455 KC.
L13 "A" OSC. 600 KC.
TOP-BOTTOM 455 KC.
PHONO JACK
POWER CORD

Lead Dress

1. Dress all filament and power leads down to chassis and as far as possible from all audio grid and plate wiring.
2. Dress power cord back and away from C-14 (1st audio coupling condenser).
3. Dress C-14 toward 12SQ7 socket and away from the switch.
4. Dress C-16 (output by-pass condenser) down to chassis.
5. Dress blue lead from phono jack to volume control in air and away from output transformer.
7. Dress all leads and parts away from oscillator coils.
8. Dress C-2 (R.F. coupling condenser) back to chassis.
9. Avoid excessive lead lengths in C-27 (short wave fixed trimmer) and short wave antenna coil.
10. Dress pilot light leads (above chassis) toward dial support and away from the 35Z5 tube.


550
3¼"
2 15/16"
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DRIVE CORD
DRUM
2½ TURNS
DC15

To permit easier alignment C26 is now mounted on the range switch and changed in value (40-370 mmf.) Stock No. 73075. In some sets capacitor C16 is connected between plate and cathode of 35L6GT.


V1 12SG7 R.F.
V2 12SA7 1ST DET. & OSC.
V3 12SK7 I.F.
V4 12SQ7 2ND DET., A.V.C., A.F.
V5 35L6 GT OUTPUT
V6 35Z5 GT RECT.
1ST. I.F. TRANS. T1
2ND. I.F. TRANS. T2
L16 SEC. 14Ω
L15 PRI. 0.3Ω
R13-12K
L1-2Ω
R1 3900
C2 220
52V.
76V.
L2-18Ω
R2-220K
C1 33
C4 56
R3 33K
C5 110
C6 100
C7 .05
C3 0.1
R4 220K
C8 122
C10 122
C11 155
C13 155
C29 0.1
R5 3.3 MEG.
R12 47K
*50V.
C9 330
C15 .005
R7 4.7 MEG.
C14 .02
R8 220K
C12 .002
C16 .02
T3
BLU
GRN
RED
BRN
BLK
L9 2.8Ω
R10 470K
R9 120
R11 1200
103V.
3.9V.
C17 50 MF.
C18 30 MF.
C19 .05
110 V.
C28 .01
OSCILLOSCOPE CONN'S
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS
PHONO. JACK
VOLUME CONTROL R6 500K
C27 146
L14 0.2Ω
C20 400-700
C21 108
L10 .2Ω
L11
C26 180-250
S2 REAR
S2 FRONT
L12 .6Ω
L13 3.5Ω
C24 2-17
C25 13-499
C23 10-181
C22 2-17
INDEX TAB
TOP
L14 ANT. COIL
WAVE TRAP & PEAKING COIL
"A" OSC. COIL
TOP VIEW OF COILS
"C" OSC. COIL
LOOP ANTENNA L15, L16
12SQ7
12SA7
12SG7
12SK7
35L6 GT/G
S1
MAZDA #1490

RANGE SW. VIEWED FROM FRONT AND SHOWN IN NO. 1 (MAX. COUNTER CLOCKWISE) POSITION.
POS. 1 540–1600 KC. MIN. HI.
2 540–1600 KC. MAX. HI.
3 9–12 MC. MIN. HIGHS

K = 1000
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.

INDICATES COMMON WIRING INSULATED FROM CHASSIS.

INDICATES CHASSIS GROUND

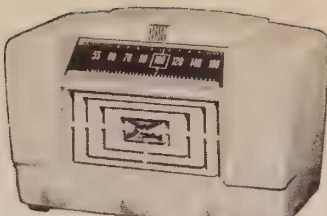
RATING—
105-125V AC, 50-60 CY. 27.6W
105-125V DC

POWER OUTPUT—
UNDISTORTED - - - - 1 WATT
MAXIMUM - - - - - - - 1.5 WATT

CATHODE CURRENTS—
12SG7 - - - - - 8.7 MA.
12SA7 - - - - 7.1 "
12SK7 - - - - 11.5 "
12SQ7 - - - - .12 "
35L6 GT - - 30.9 "
35Z5 GT - - 57.5 "

P-923111-1

66X11—(Brown Plastic)
66X12—(Ivory Plastic) →



PH 170

← *66X13—(Wood)*

PH 171

RCA VICTOR

66 X 11, 66 X 12, 66 X 13

Chassis No. RC-1046A, RC-1046, RC-1046B

Second Production 66 X 11, 66 X 13

Chassis No. RC-1046C, RC-1046E

Mfr. No. 274

SERVICE DATA

1947 . . . No. 4

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range	540-1600 kc
Intermediate Frequency	455 kc
Power Output	
Undistorted	1.0 watt
Maximum	1.5 watts
Tube Complement	
(1) RCA-12SG7	Converter
(2) RCA-12SK7	I.F. Amplifier
(3) RCA-12SQ7	2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-35L6GT	Power Output
(5) RCA-12J5GT	Oscillator
(6) RCA-35Z5GT	Rectifier
Loudspeaker	
Type	5-inch PM
V. C. Impedance	3.2 ohms at 400 cycles
Tuning Drive Ratio	20.8:1

Power Supply Rating	
105-125 volts, AC, 50 or 60 cycles, or DC	30 watts
Dial Lamps	
RC-1046, RC-1046A, RC-1046B, RC-1046C	2 Type 1490, 3.2 volts, 0.16 amp.
RC-1046E	1 Type 47, 6-8 volts, 0.15 amp.

Cabinet Dimensions	Height	Width	Depth
66X11 (Brown Plastic)	8 5/16″	13⅝″	7⅛″
66X12 (Ivory Plastic)	8 5/16″	13⅝″	7⅛″
66X13 (Wood)	9 3/16″	14¼″	7⅞″

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1046—66x12 RC-1046A—66x11 (1st) RC-1046B—66x13 (1st) RC-1046C—66x11 (2nd) RC-1046E—66x13 (2nd)
73172	Capacitor—Ceramic, 56 mmf. (2nd prod. only) (C19)
72571	Capacitor—Mica, 330 mmf. (C8)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C10)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C9)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C1, C3, C4)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C7, C11)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C22)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C20, C21)
72604	Coil—Oscillator coil complete with adjustable core and stud (1st prod. only) (L3, L4, L5)
73163	Coil—Oscillator coil complete with adjustable core and stud (2nd prod. only) (L3, L4)
72607	Condenser—Variable tuning condenser (1st prod. only) (C12, C13, C14, C15, C16)
73164	Condenser—Variable tuning condenser (2nd prod. only) (C12, C13, C14, C15)
36228	Control—Tone control (S2)
38410	Control—Volume control and power switch (R13, S1)
	Cord—Drive cord (approx. 56″ overall—1st prod.) (approx. 49″ overall—2nd prod.)
73165	Dial—Polystyrene dial scale for Model 66x13
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
72606	Indicator—Station selector for Models 66x11 and 66x12
72799	Indicator—Station selector for Model 66x13
71116	Lamp—Dial Lamp—Type 1490—for Models 66x11, 66x12, and 1st prod. 66x13
31480	Lamp—Dial lamp—Mazda 47—for Model 66x13, 2nd prod.
72697	Loop—Antenna loop complete—1st prod. only (L1, L2)
73030	Loop—Antenna loop complete—2nd prod. only (L1, L2)
72765	Nut—Speed nut to fasten dial for Model 66x13 (2 required)
73162	Plate—Dial back plate complete with drive cord pulleys for Model 66x13
72896	Plate—Dial back plate complete with drive cord pulleys for Models 66x11, and 66x12
72602	Pulley—Drive cord pulley
	Resistor—Fixed composition, 120 ohms, ±10%, ½ watt (R6, R14)
	Resistor—Fixed composition, 1200 ohms, ±10%, 1 watt (R11)
	Resistor—Fixed composition, 1500 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed composition, 3300 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R2)
	Resistor—Fixed composition, 47,000 ohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R8, R10)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed composition, 3.3 megohms, ±20%, ½ watt (R5)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R9)
72608	Shaft—Tuning knob shaft
72605	Socket—Lamp socket for Models 66x11, 66x12 and 1st prod. 66x13
34449	Socket—Lamp socket for Model 66x13
37605	Socket—Tube socket—molded
32299	Socket—Tube socket—wafer
31418	Spring—Drive cord spring
70411	Transformer—First I. F. transformer (T1)
70466	Transformer—Second I. F. transformer (T2, C5, C6)
36800	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 92572-2W—(RL 101-3)
72201	Speaker—5″ P.M. speaker complete with cone and voice coil
	SPEAKER ASSEMBLY 92510-1
70413	Speaker—5″ P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order by referring to model number of instrument, and number stamped on speaker.
	MISCELLANEOUS
72646	Back—Cabinet back for Model 66x11
72647	Back—Cabinet back for Model 66x12
73169	Back—Cabinet back for Model 66x13
72648	Baffle—Speaker baffle and grille cloth for Models 66x11 and 66x12
Y1400	Cabinet—Brown plastic cabinet for Model 66x11
Y1401	Cabinet—Ivory plastic cabinet for Model 66x12
36891	Clamp—Dial clamp—R.H.—for Models 66x11 and 66x12
36890	Clamp—Dial clamp—L.H.—for Models 66x11 and 66x12
73167	Clamp—Dial window clamp for Model 66x13 (2 required)
X1637	Cloth—Grille cloth for Model 66x13
72652	Dial—Glass dial scale for Models 66x11 and 66x12
37831	Fasteners—Push fasteners (1 set) for cabinet backs for Models 66x11 and 66x12
71595	Foot—Rubber foot for Model 66x13 (4 required)
72650	Jewel—Jewel and holder for cabinet for Models 66x11 and 66x12
71821	Knob—Control knob—maroon—for Models 66x11 and 66x13
72645	Knob—Control knob—ivory—for Model 66x12
72649	Motif—Decorative motif for cabinet tops for Models 66x11 and 66x12
73168	Motif—Decorative motif for Model 66x13
38458	Nut—Speed nut for decorative motif for Models 66x11 and 66x12
72765	Nut—Speed nut for dial window clamp for Model 66x13
30900	Spring—Retaining spring for knobs
73170	Window—Dial window for Model 66x13

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common wiring (power gnd.) Keep the output signal as low as possible to avoid AVC action.

Output Meter.—Connect leads between speaker voice coil and chassis. Turn volume control to maximum clockwise, tone control to maximum highs (clockwise).

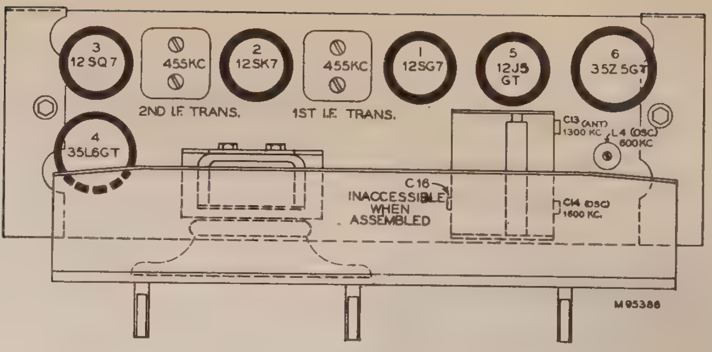
Dial Pointer Adjustment.—Rotate tuning condenser fully counterclockwise (plates closed). Adjust indicator pointer to 2⅛" from left hand edge of dial back plate.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	Sec. and pri. 2nd I-F trans.
2				Sec. and pri. 1st I-F trans.
3	Ant. lead in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)*
4		1,300 kc	1,300 kc	C13 ant.
5		600 kc	600 kc	L4 (osc.) Rock in
6	Repeat steps 3, 4 and 5.			

*Left hand osc. trimmer C16 should be pre-set approx. ¼ turn from tight.
Not used on 2nd prod.

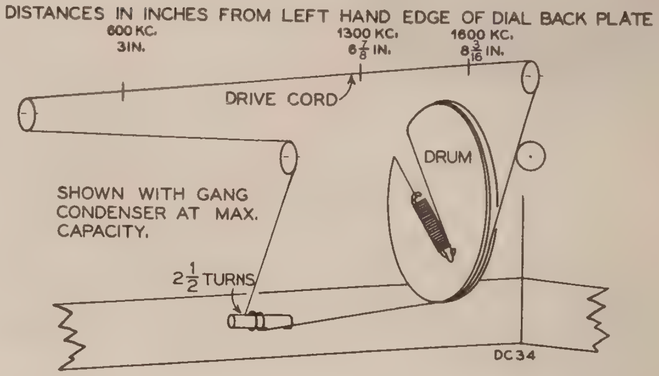
Critical Lead Dress

1. Dress output plate bypass capacitor (C-11 .02 mf) against chassis.
2. Dress 35L6GT plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7 .02 mf) away from 35L6GT heater leads.
4. Dress tone control lead against front apron.
5. Dress 2nd i-f yellow and brown leads away from output plate bypass capacitor (C-11, .02 mf.) and away from all heater leads.
6. Dress tone control capacitor (C-10, .002 mf.) away from oscillator coil.
7. Dress blue and green leads of both i-f transformers back in shields leaving exposed lengths as short as possible.



3 12SQ7
455KC
2 12SK7
455KC
1 12SG7
5 12J5 GT
6 35Z5GT
4 35L6GT
2ND I.F. TRANS.
1ST I.F. TRANS.
C13 (ANT) 1300 KC
L4 (OSC) 600 KC
C16 INACCESSIBLE WHEN ASSEMBLED
C14 (OSC) 1600 KC.
M95388

Tube and Trimmer Locations



DISTANCES IN INCHES FROM LEFT HAND EDGE OF DIAL BACK PLATE
600 KC. 3IN.
1300 KC. 6⅞ IN.
1600 KC. 8$\frac{3}{16}$ IN.
DRIVE CORD
DRUM
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
2½ TURNS
DC34

Dial-Indicator and Drive Mechanism

Chassis Identification

Chassis No. RC-1046, RC-1046A, RC-1046B:

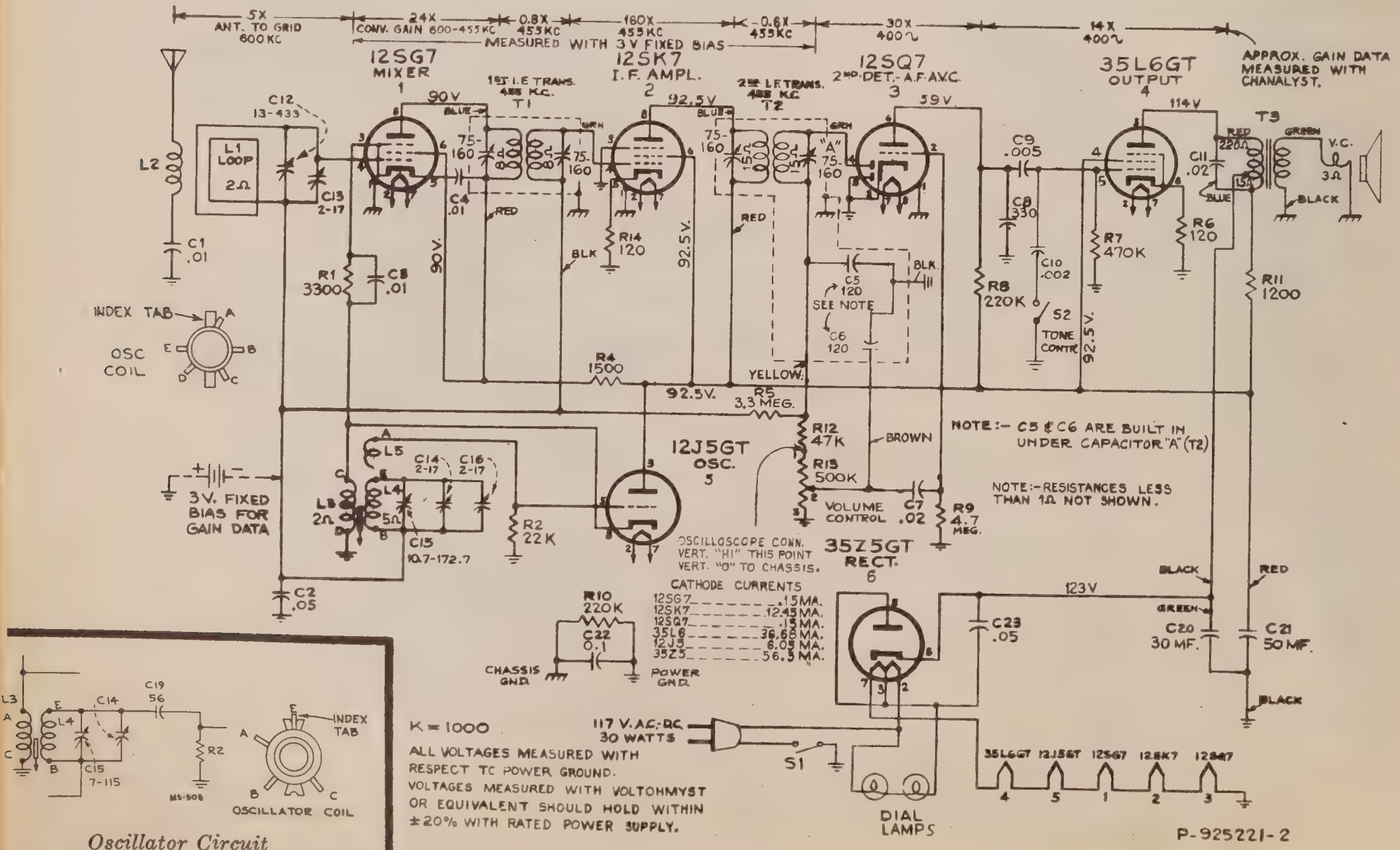
Use oscillator coil with capacity winding L5, does not use C19. Use tuning condenser which includes C16. Use two dial lamps Type No. 1490.

Chassis No. RC-1046C:

Use oscillator coil without capacity winding, C19 is used. Use tuning condenser without C16. Use two dial lamps Type No. 1490.

Chassis No. RC-1046E:

Same as described for RC-1046C except use 1 dial lamp Type No. 47.



5X ANT. TO GRID 600 KC
24X CONV. GAIN 600-455 KC
0.8X 455 KC
160X 455 KC
0.6X 455 KC
MEASURED WITH 3V FIXED BIAS
30X 400〜
14X 400〜
APPROX. GAIN DATA MEASURED WITH CHANALYST.
12SG7 MIXER 1
12SK7 I.F. AMPL. 2
12SQ7 2ND DET.-A.F.-A.V.C. 3
35L6GT OUTPUT 4
1ST I.F. TRANS. 455 KC. T1
2ND I.F. TRANS. 455 KC T2
90V
92.5V
59V
114V
BLUE
GRN
RED
BLK
YELLOW
BROWN
C12 13-433
L1 LOOP 2Ω
L2
C13 2-17
C1 .01
C4 .01
75-160
"A" 75-160
R1 3300
C3 .01
R14 120
C5 120 SEE NOTE
C6 120
BLK.
C9 .005
C8 330
C10 .002
R8 220K
S2 TONE CONTR.
R7 470K
R6 120
C11 .02
T3
RED 220Ω
GREEN
V.C. 3Ω
BLUE
15Ω
BLACK
R11 1200
R4 1500
92.5V.
R5 3.3 MEG.
R12 47K
R13 500K
VOLUME CONTROL
C7 .02
R9 4.7 MEG.
NOTE:— C5 & C6 ARE BUILT IN UNDER CAPACITOR "A" (T2)
NOTE:—RESISTANCES LESS THAN 1Ω NOT SHOWN.
INDEX TAB
OSC COIL
A B C D E
3V. FIXED BIAS FOR GAIN DATA
L5
L4 5Ω
L3 2Ω
C14 2-17
C16 2-17
C15 10.7-172.7
R2 22K
12J5GT OSC. 5
C2 .05
OSCILLOSCOPE CONN. VERT. "HI" THIS POINT VERT. "O" TO CHASSIS.
35Z5GT RECT. 6
CATHODE CURRENTS
12SG7 .15MA.
12SK7 12.45MA.
12SQ7 .15MA.
35L6 36.68MA.
12J5 6.05MA.
35Z5 56.5MA.
R10 220K
C22 0.1
CHASSIS GND.
POWER GND.
123V
BLACK
GREEN
RED
C20 30 MF.
C21 50 MF.
C23 .05
K = 1000
117 V. AC.-DC. 30 WATTS
ALL VOLTAGES MEASURED WITH RESPECT TO POWER GROUND.
VOLTAGES MEASURED WITH VOLTOHMYST OR EQUIVALENT SHOULD HOLD WITHIN ±20% WITH RATED POWER SUPPLY.
S1
DIAL LAMPS
35L6GT 12J5GT 12SG7 12SK7 12SQ7
4 5 1 2 3
P-925221-2

L3
A
C
B
E
L4
C14
C15 7-115
C19 56
R2
MS-508
INDEX TAB
OSCILLATOR COIL

Oscillator Circuit RC-1046C, RC-1046E

Schematic otherwise identical to RC-1046,-A,-B except ant. tuning cond. C12 is 10-398 mmfd., only one dial lamp used on RC-1046E.

Schematic Diagram—RC-1046, RC-1046A, RC-1046B

Models 67V1, 67AV1

RCA VICTOR

Radio-Phonograph Combination

MODELS 67V1, 67AV1

1st Production—Chassis No. RC-606
2nd Production—Chassis No. RC-606C
Mfr. No. 274

FOR RECORD CHANGER INFORMATION
REFER TO SERVICE DATA FOR MODEL 960260-1

SERVICE DATA

— 1946 No. 10 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast "A"	540-1,600 kc
Short Wave "C"	9.2-16 mc
Intermediate Frequency	455 kc

TUBE COMPLEMENT CHASSIS NO. RC-606

(1) RCA-6SA7	1st Det., Oscillator
(2) RCA-6SG7	I-F Amplifier
(3) RCA-6SQ7	2nd Det., A. V. C., and Phase Inverter
(4) RCA-6SQ7	A-F Amplifier
(5) RCA-6K6-GT	Power Output
(6) RCA-6K6-GT	Power Output
(7) RCA-5Y3-GT	Rectifier

TUBE COMPLEMENT CHASSIS NO. RC-606C

(1) RCA-6SA7	1st Det., Oscillator
(2) RCA-6SK7	I-F Amplifier
(3) RCA-6SQ7	2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7	A-F Amplifier
(5) RCA-6V6-GT	Power Output
(6) RCA-6V6-GT	Power Output
(7) RCA-6X5-GT	Rectifier

POWER SUPPLY RATING (including phono motor)

105-125 volts, 60 cycles	95 watts

LOUDSPEAKER

Type (92566-1) (used with RC-606)	12 inch EM
Type (92569-1) (used with RC-606C)	12 inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

POWER OUTPUT

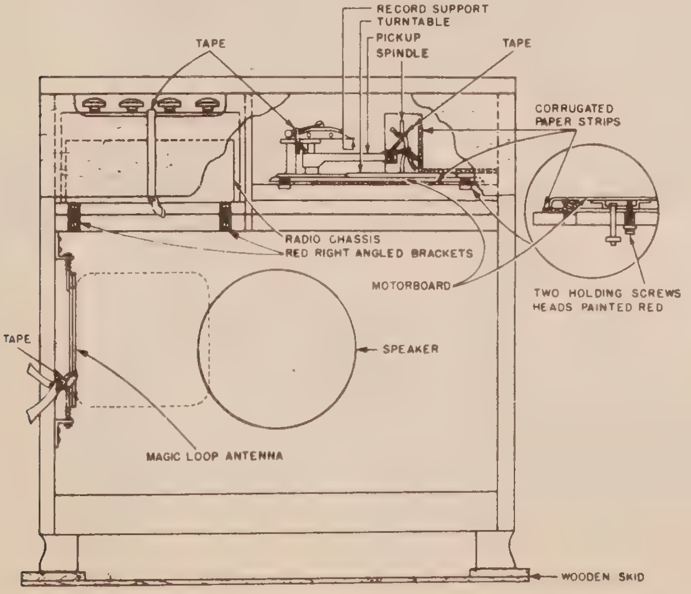
Undistorted	5 watts
Maximum	6.5 watts
Pilot Lamps	(2) Mazda No. 51, 6-8 volts, 0.2 amp.
Compartment Lamp	(1) Mazda No. 55, 6-8 volts, 0.4 amp.

RECORD CHANGER

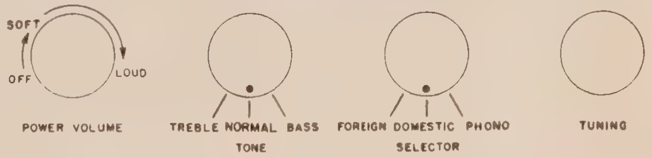
Type	960260-1
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable	78 r.p.m. type
Type Pickup	Crystal

DIMENSIONS

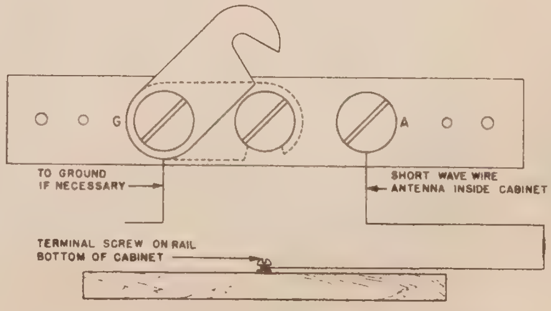
	Cabinet	Chassis (overall)
Height (inches)	34	5⅝
Width (inches)	31	11⅛
Depth (inches)	16¼	8
Tuning Drive Ratio		14.1


RECORD SUPPORT
TURNTABLE
PICKUP
SPINDLE
TAPE
TAPE
CORRUGATED PAPER STRIPS
RADIO CHASSIS
RED RIGHT ANGLED BRACKETS
MOTORBOARD
TWO HOLDING SCREWS HEADS PAINTED RED
TAPE
SPEAKER
MAGIC LOOP ANTENNA
WOODEN SKID

BACK VIEW

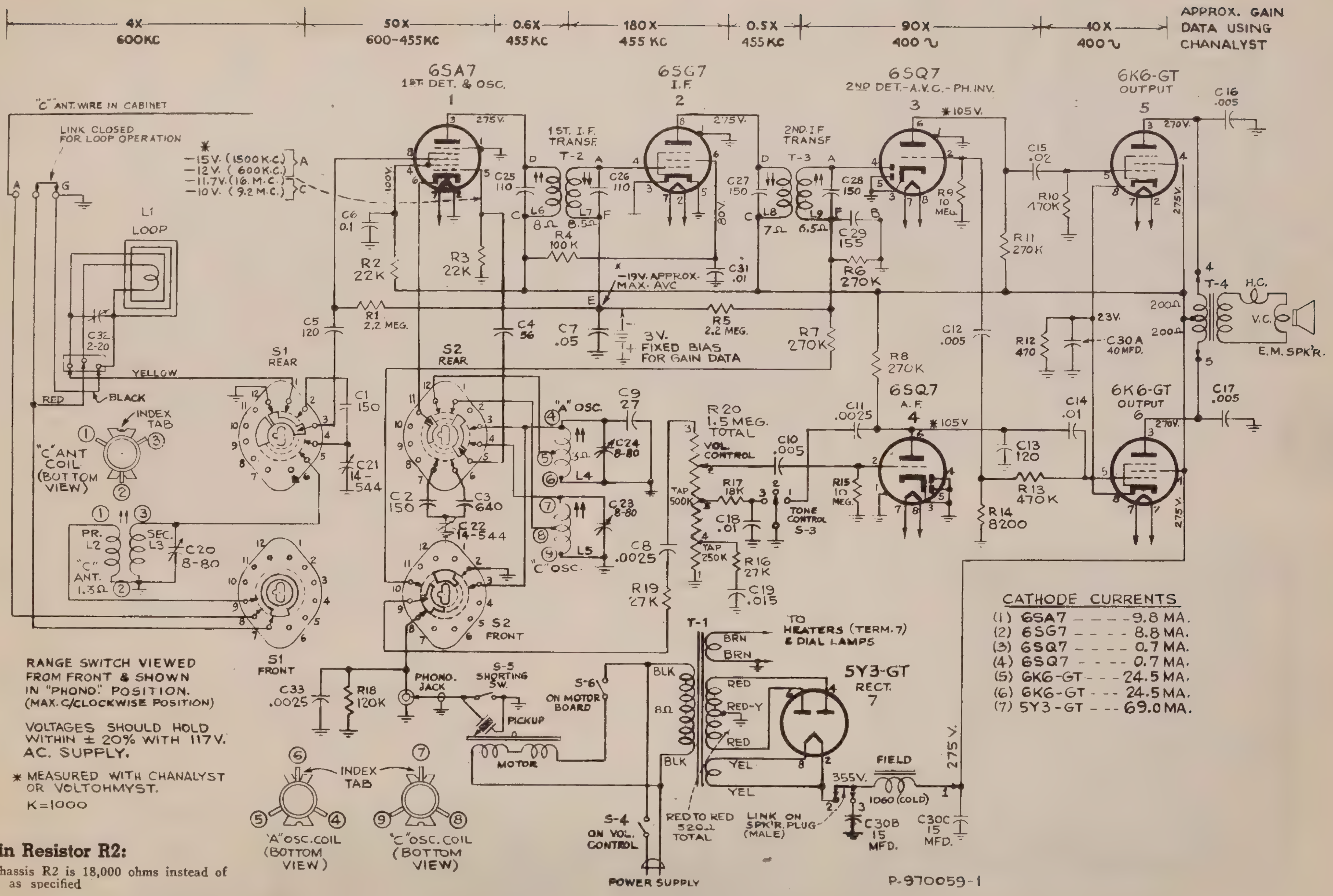

SOFT
OFF
LOUD
POWER VOLUME
TREBLE NORMAL BASS
TONE
FOREIGN DOMESTIC PHONO
SELECTOR
TUNING

FRONT PANEL CONTROLS


G
A
TO GROUND IF NECESSARY
SHORT WAVE WIRE ANTENNA INSIDE CABINET
TERMINAL SCREW ON RAIL BOTTOM OF CABINET

If required, connect external antenna to terminal screw.

ANTENNA TERMINAL BOARD


APPROX. GAIN DATA USING CHANALYST
4X 600KC
50X 600-455KC
0.6X 455KC
180X 455 KC
0.5X 455KC
90X 400 ∿
40X 400 ∿
6SA7 1ST DET. & OSC. 1
6SG7 I.F. 2
6SQ7 2ND DET.-A.V.C.-PH.INV. 3
6K6-GT OUTPUT 5
6SQ7 A.F. 4
6K6-GT OUTPUT 6
5Y3-GT RECT. 7
"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
A G
L1 LOOP
* −15V. (1500 K.C.) −12V. (600 K.C.) A
−11.7V. (16 M.C.) −10V. (9.2 M.C.) C
275V.
100V.
C6 0.1
R2 22K
R3 22K
C25 110
1ST. I.F. TRANSF. T-2
D A C F
L6 8Ω
L7 8.5Ω
R4 100K
C26 110
80V.
C31 .01
*−19V. APPROX. MAX. AVC
E
C27 150
2ND. I.F. TRANSF T-3
L8 7Ω
L9 6.5Ω
C28 150
C29 155
B
R6 270K
R9 10 MEG.
*105V.
C15 .02
R10 470K
R11 270K
C16 .005
270V.
T-4
H.C.
V.C.
E.M. SPK'R.
200Ω
200Ω
23V.
R12 470
C30A 40 MFD.
C12 .005
C5 120
R1 2.2 MEG.
C4 56
C7 .05
3V. FIXED BIAS FOR GAIN DATA
R5 2.2 MEG.
R7 270K
R8 270K
C32 2-20
YELLOW
BLACK
RED
S1 REAR
C1 150
C21 14-544
S2 REAR
"A" OSC.
C9 27
C24 8-80
L4
3Ω
C2 150
C3 640
C22 14-544
C23 8-80
L5
"C" OSC.
INDEX TAB
"C" ANT COIL (BOTTOM VIEW)
PR. L2
SEC. L3
C20 8-80
"C" ANT. 1.3Ω
S1 FRONT
S2 FRONT
R20 1.5 MEG. TOTAL
VOL. CONTROL
TAP 500K
TAP 250K
R17 18K
C18 .01
C10 .005
C11 .0025
TONE CONTROL S-3
R15 10 MEG.
*105V
C14 .01
C13 120
R13 470K
R14 8200
C17 .005
C8 .0025
R16 27K
C19 .015
R19 27K
T-1
BRN
TO HEATERS (TERM. 7) & DIAL LAMPS
BLK
8Ω
RED
RED-Y
YEL
FIELD
1060 (COLD)
355V.
275V.
C30B 15 MFD.
C30C 15 MFD.
LINK ON SPK'R. PLUG (MALE)
RED TO RED 520Ω TOTAL
C33 .0025
R18 120K
PHONO. JACK
S-5 SHORTING SW.
PICKUP
S-6 ON MOTOR BOARD
MOTOR
S-4 ON VOL. CONTROL
POWER SUPPLY
"A" OSC. COIL (BOTTOM VIEW)
"C" OSC. COIL (BOTTOM VIEW)
P-970059-1

CATHODE CURRENTS

(1)	6SA7	9.8 MA.
(2)	6SG7	8.8 MA.
(3)	6SQ7	0.7 MA.
(4)	6SQ7	0.7 MA.
(5)	6K6-GT	24.5 MA.
(6)	6K6-GT	24.5 MA.
(7)	5Y3-GT	69.0 MA.

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "PHONO." POSITION. (MAX. C/CLOCKWISE POSITION)

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. AC. SUPPLY.

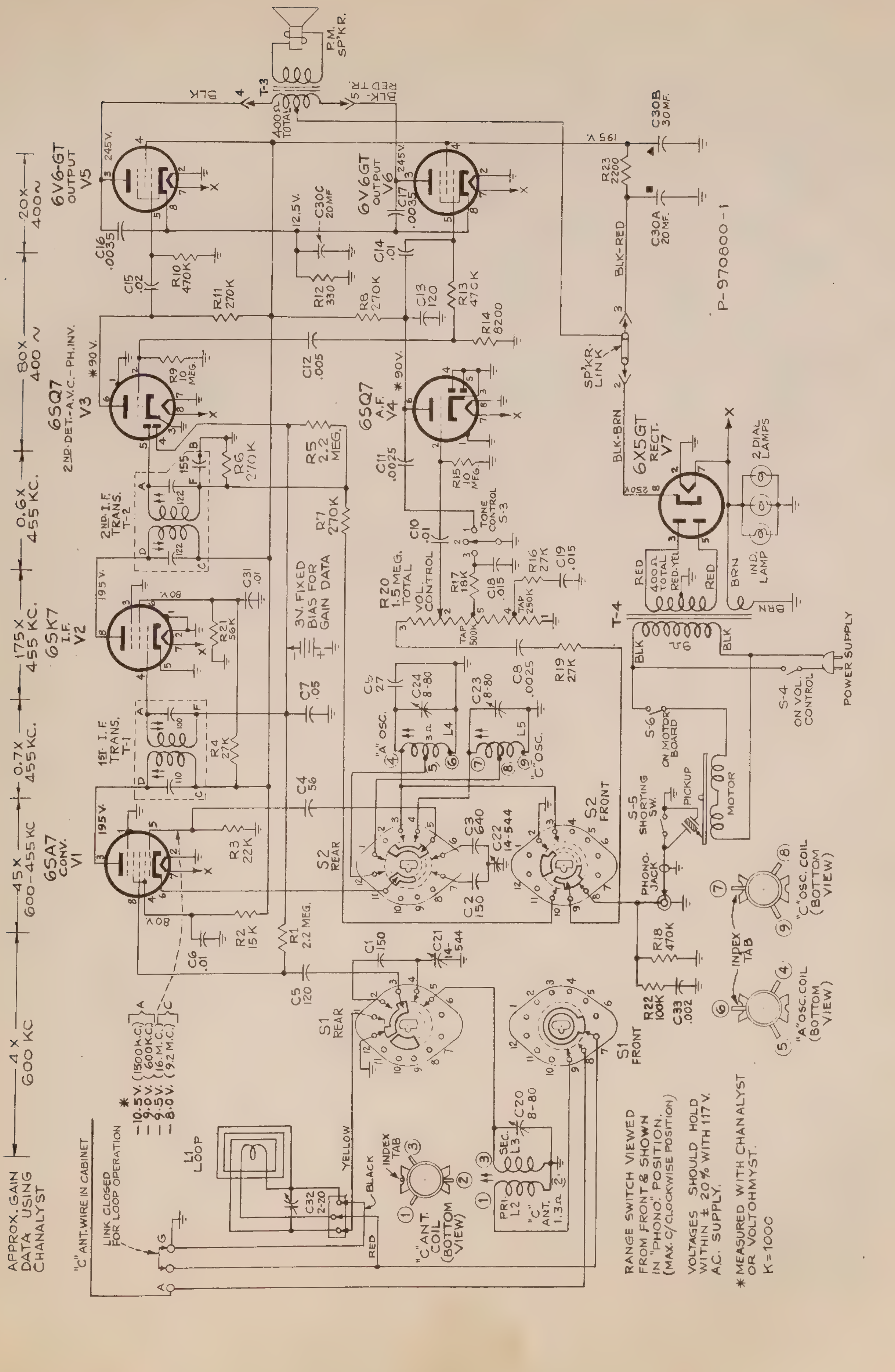
* MEASURED WITH CHANALYST OR VOLTOHMYST.

K=1000

SCHEMATIC DIAGRAM—CHASSIS NO. RC-606

Change in Resistor R2:

In some chassis R2 is 18,000 ohms instead of 22,000 ohms as specified

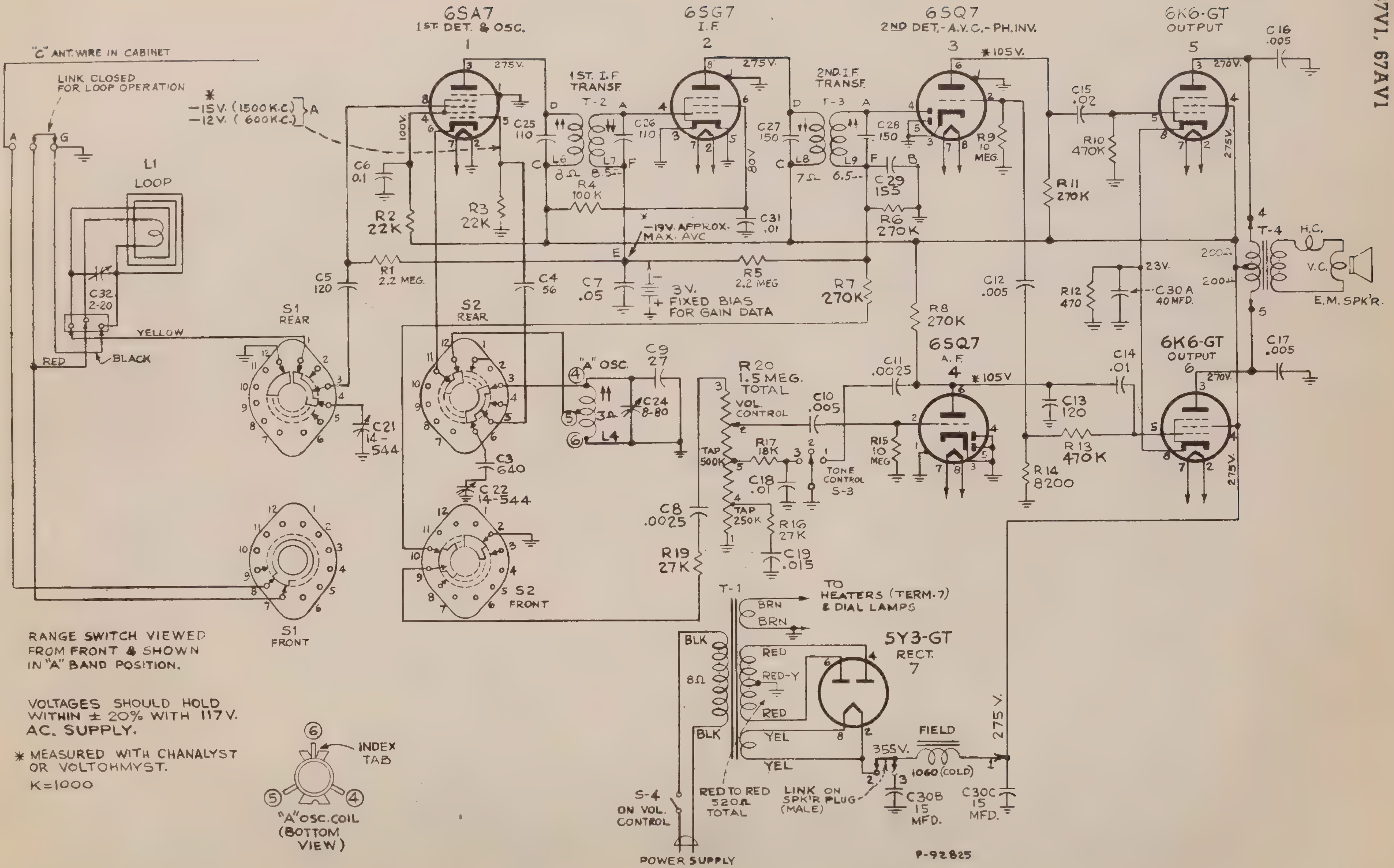

APPROX. GAIN DATA USING CHANALYST
4X 600 KC
45X 600-455 KC
0.7X 455 KC.
175X 455 KC.
0.6X 455 KC.
80X 400 ~
20X 400 ~
6SA7 CONV. V1
6SK7 I.F. V2
6SQ7 2ND DET.-A.V.C.-PH.INV. V3
6SQ7 A.F. V4
6V6-GT OUTPUT V5
6V6GT OUTPUT V6
6X5GT RECT. V7
1ST I.F. TRANS. T-1
2ND I.F. TRANS. T-2
T-3
T-4
P.M. SP'KR.
"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
L1 LOOP
C32 2-20
YELLOW
BLACK
RED
*
-10.5 V. (1500 K.C.)
-9.0 V. (600 K.C.)
-9.5 V. (16 M.C.)
-8.0 V. (9.2 M.C.)
A
C
3V. FIXED BIAS FOR GAIN DATA
R1 2.2 MEG.
R2 15K
R3 22K
R4 27K
R5 2.2 MEG.
R6 270K
R7 270K
R8 270K
R9 10 MEG.
R10 470K
R11 270K
R12 330
R13 470K
R14 8200
R15 10 MEG.
R16 27K
R17 18K
R18 470K
R19 27K
R20 1.5 MEG. TOTAL VOL. CONTROL
TAP 500K
TAP 250K
R21 56K
R22 100K
R23 2200
C1 150
C2 150
C3 640
C4 56
C5 120
C6 .01
C7 .05
C8 .0025
C9 27
C10 .01
C11 .0025
C12 .005
C13 120
C14 .01
C15 .02
C16 .0035
C17 .0035
C18 .015
C19 .015
C20 8-80
C21 14-544
C22 14-544
C23 8-80
C24 8-80
C30A 20 MF.
C30B 30 MF.
C30C 20 MF
C31 .01
C33 .002
195 V.
80 V.
90 V.
245 V.
12.5 V.
250 V.
195 V.
S1 REAR
S1 FRONT
S2 REAR
S2 FRONT
"A" OSC. L4
"C" OSC. L5
3Ω
PRI. L2
SEC. L3
"C" ANT. 1.3Ω
"C" ANT. COIL (BOTTOM VIEW)
INDEX TAB
"A" OSC. COIL (BOTTOM VIEW)
"C" OSC. COIL (BOTTOM VIEW)
TONE CONTROL S-3
PHONO. JACK
S-5 SHORTING SW.
PICKUP
MOTOR
S-6 ON MOTOR BOARD
S-4 ON VOL. CONTROL
POWER SUPPLY
SP'KR. LINK
BLK-BRN
BLK-RED
BLK
RED
BRN
400Ω TOTAL
RED-YEL
IND. LAMP
2 DIAL LAMPS
400Ω TOTAL
BLK TR 5
RED
P-970800-1

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "PHONO" POSITION. (MAX. C/CLOCKWISE POSITION)

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. A.C. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.
K=1000

SCHEMATIC DIAGRAM—CHASSIS NO. RC-606C


6SA7
1ST DET. & OSC.
1
6SG7
I.F.
2
6SQ7
2ND DET.-A.V.C.-PH.INV.
3
6K6-GT
OUTPUT
5
6SQ7
A.F.
4
6K6-GT
OUTPUT
6
5Y3-GT
RECT.
7
"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
* −15V. (1500 K.C.) −12V. (600 K.C.) A
L1
LOOP
C32 2-20
YELLOW
BLACK
RED
S1 REAR
S1 FRONT
S2 REAR
S2 FRONT
1ST. I.F. TRANSF. T-2
2ND I.F. TRANSF. T-3
−19V. APPROX. MAX. AVC
3V. FIXED BIAS FOR GAIN DATA
"A" OSC.
L4
R20 1.5 MEG. TOTAL
VOL. CONTROL
TAP 500K
TAP 250K
TONE CONTROL S-3
T-1
T-4
H.C.
V.C.
E.M. SPK'R.
BRN
TO HEATERS (TERM-7) & DIAL LAMPS
RED
RED-Y
YEL
BLK
8Ω
FIELD
1060 (COLD)
355V.
275V.
LINK ON SPK'R PLUG (MALE)
RED TO RED 520Ω TOTAL
S-4 ON VOL. CONTROL
POWER SUPPLY
C30B 15 MFD.
C30C 15 MFD.
C30A 40 MFD.
INDEX TAB
"A" OSC. COIL (BOTTOM VIEW)
P-92825

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "A" BAND POSITION.

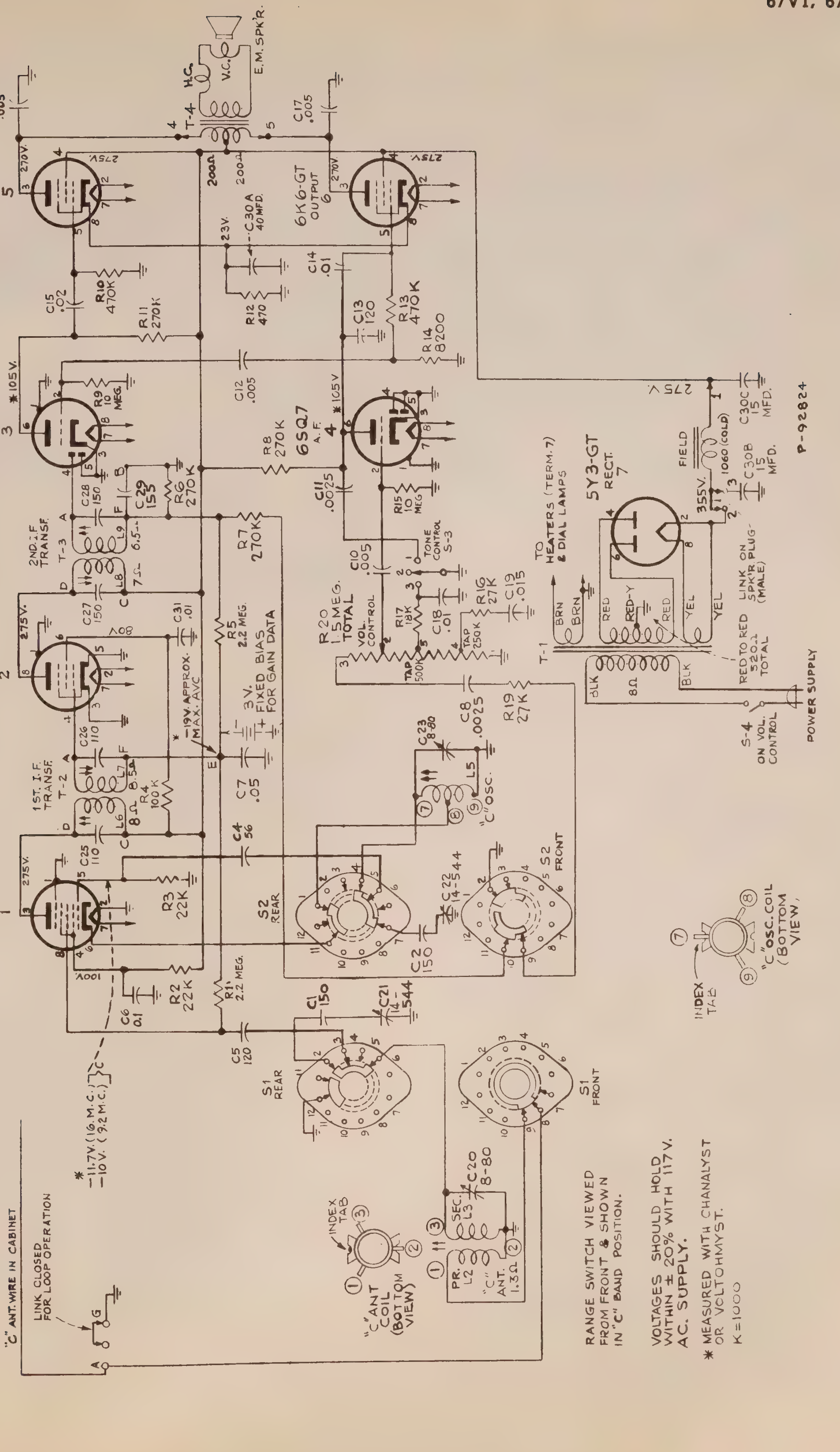
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

K=1000

SIMPLIFIED SCHEMATIC DIAGRAM—CHASSIS NO. RC-606—"A" BAND

NOTE: Ant. and Osc. circuits of chassis No. RC-606C are identical to that shown above.


6SA7
1ST DET & OSC.
1
6SG7
I.F.
2
6SQ7
2ND DET.-A.V.C.-PH. INV.
3
6SQ7
A.F.
4
6K6-GT
OUTPUT
5
6K6-GT
OUTPUT
6
5Y3-GT
RECT.
7
1ST. I.F. TRANSF. T-2
2ND. I.F. TRANSF. T-3
T-4
H.C.
V.C.
E.M. SPK'R.
C16 .005
C17 .005
C15 .02
C14 .01
C13 120
C12 .005
C11 .0025
C10 .005
C8 .0025
C18 .01
C19 .015
C30A 40 MFD.
C30B 15 MFD.
C30C 15 MFD.
C31 .01
C29 155
C28 150
C27 150
C26 110
C25 110
C7 .05
C4 56
C6 0.1
C5 120
C1 150
C2 150
C21 14-544
C22 14-544
C23 8-80
C20 8-80
R10 470K
R11 270K
R12 470
R13 470K
R14 8200
R9 10 MEG.
R8 270K
R6 270K
R7 270K
R15 10 MEG
R5 2.2 MEG.
R4 100K
R3 22K
R2 22K
R1 2.2 MEG.
R16 27K
R17 18K
R19 27K
R20 1.5 MEG. TOTAL
VOL. CONTROL
TAP 500K
TAP 250K
TONE CONTROL S-3
FIELD
1060 (COLD)
8Ω
RED TO RED 520Ω TOTAL
LINK ON SPK'R PLUG (MALE)
T-1
BRN
RED
RED-Y
YEL
BLK
TO HEATERS (TERM. 7) & DIAL LAMPS
S-4 ON VOL. CONTROL
POWER SUPPLY
270V.
275V.
23V.
*105V.
355V.
275V.
80V.
100V.
200Ω
*-19V. APPROX. MAX. AVC
3V. FIXED BIAS FOR GAIN DATA
*-11.7V. (16 M.C.) -10V. (9.2 M.C.) "C"
L5 "C" OSC.
S2 REAR
S2 FRONT
S1 REAR
S1 FRONT
PR. L2
SEC. L3
"C" ANT. 1.3Ω
"C" ANT COIL (BOTTOM VIEW)
INDEX TAB
"C" OSC. COIL (BOTTOM VIEW)
"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
A
G
P-92824

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "C" BAND POSITION.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

K=1000

SIMPLIFIED SCHEMATIC DIAGRAM—CHASSIS NO. RC-606—"C" BAND

NOTE: Ant. and Osc. circuits of chassis No. RC-606C are identical to that shown above.

67V1, 67AV1

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

1. Cut out the printed dial scale, or make a tracing of the illustration.
2. With gang at full mesh the pointer should be set to the second reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note. It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

"C" Band Reception. For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best reception on 31-meter band.

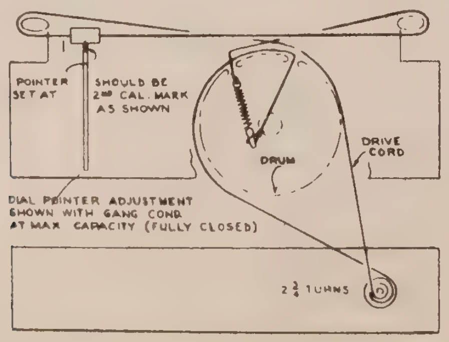
For additional information, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	†6SG7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	L8, L9 (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.			L6, L7 (1st I-F Trans.)
3	Yellow lead on loop in series with 200 mmfd. (link closed)	1,400 kc.	Broadcast 1400 kc.	C24 (osc.)
4		600 kc.	Broadcast 600 kc.	L4 (osc.) Rock gang
5		Repeat steps 3 and 4.		
6	Antenna terminal in series with 47 mmfd.	15.2 mc.	Short Wave 15.2 mc.	C23 (osc.)* C20 (ant.)
7		9.5 mc.	Short Wave 9.5 mc.	L5 (osc.) L3 (ant.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop.			

† 6SK7 in Chassis No. RC-605C.

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning the receiver to approximately 14.3 mc., where a weaker signal should be received.

Oscillator tracks 455 kc. above signal on both bands.

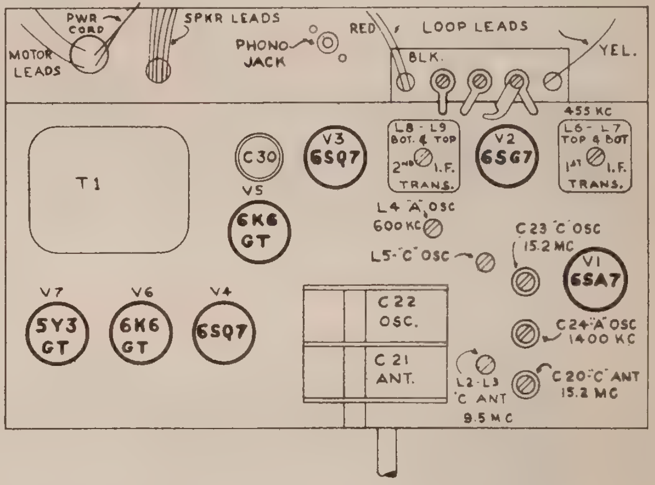

POINTER SET AT
SHOULD BE 2ND CAL. MARK AS SHOWN
DRIVE CORD
DRUM
DIAL POINTER ADJUSTMENT SHOWN WITH GANG COND. AT MAX CAPACITY (FULLY CLOSED)
2 3/4 TURNS

DIAL INDICATOR AND DRIVE MECHANISM

Critical Lead Dress.—

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress R16 away from a-c leads at on-off switch.
6. Dress R2 away from side of chassis.

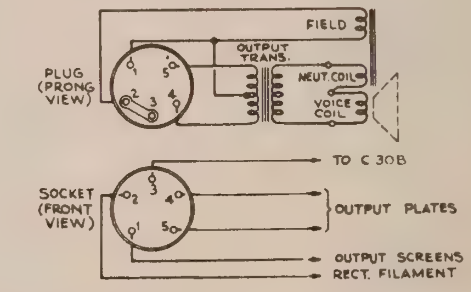
Note.—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners attached to the cabinet door.


PWR CORD
MOTOR LEADS
SPKR LEADS
PHONO JACK
RED
LOOP LEADS
BLK.
YEL.
455 KC
T1
C30
V3 6SQ7
L8 - L9 BOT. & TOP 2ND I.F. TRANS.
V2 6SG7
L6 - L7 TOP & BOT 1ST I.F. TRANS.
V5 6K6 GT
L4 "A" OSC 600 KC
C23 "C" OSC 15.2 MC
L5 "C" OSC
V1 6SA7
V7 5Y3 GT
V6 6K6 GT
V4 6SQ7
C22 OSC.
C21 ANT.
C24 "A" OSC 1400 KC
L2-L3 "C" ANT 9.5 MC
C20 "C" ANT 15.2 MC

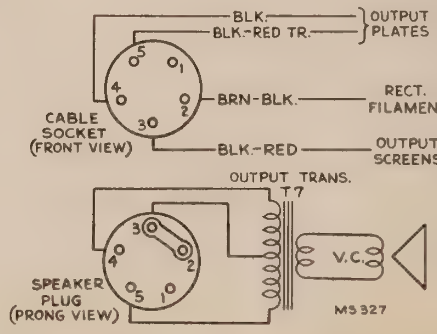
TUBE AND TRIMMER LOCATIONS CHASSIS NO. RC-606

Note:—Chassis RC-606C is identical except:

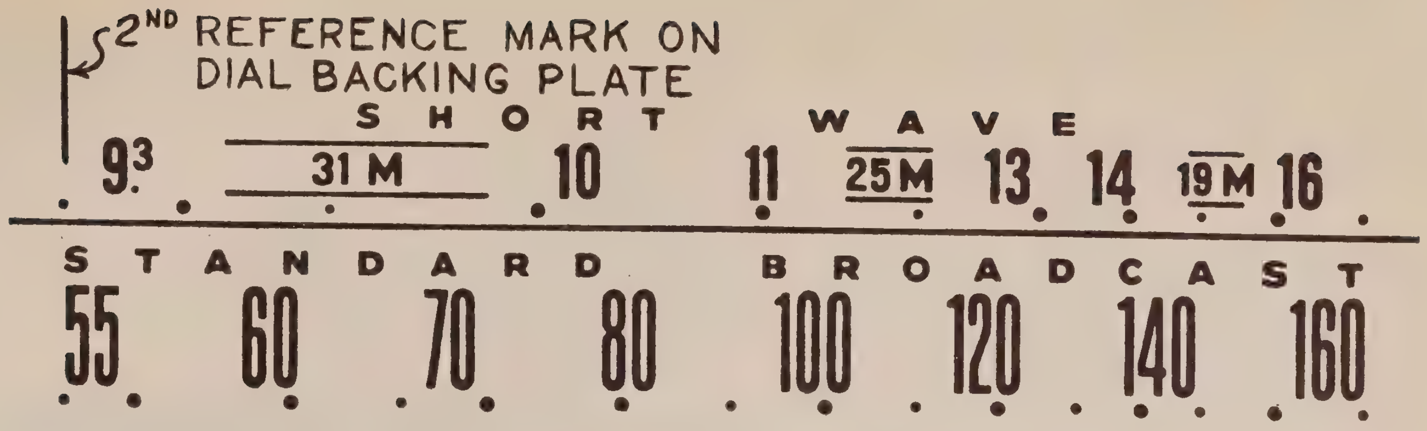
V2.6SG7 is changed to 6SK7
V5.6K6GT is changed to 6V6GT
V6.6K6GT is changed to 6V6GT
V7.5Y3GT is changed to 6X5GT


FIELD
OUTPUT TRANS.
PLUG (PRONG VIEW)
NEUT. COIL
VOICE COIL
TO C 30B
SOCKET (FRONT VIEW)
OUTPUT PLATES
OUTPUT SCREENS
RECT. FILAMENT

SPEAKER CONNECTIONS (EM) 92566-1


BLK.
BLK.-RED TR.
OUTPUT PLATES
BRN-BLK.
RECT. FILAMENT
CABLE SOCKET (FRONT VIEW)
BLK.-RED
OUTPUT SCREENS
OUTPUT TRANS.
T7
V.C.
SPEAKER PLUG (PRONG VIEW)
MS 327

SPEAKER CONNECTIONS (PM) 92569-1



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

1st Production—Replacement Parts—Chassis No. RC-606

For Record Changer Parts refer to Service Data for Model 960260-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC 606)
71601	Board—"Ant. ground" board
71606	Bracket—Dial bracket with drive cord pulley (L. H.)
71605	Bracket—Dial bracket with drive cord pulley (R. H.)
71615	Capacitor—Ceramic, 27 mmf. (C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71610	Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24)
71614	Capacitor—Ceramic, 120 mmf. (C5, C13)
71612	Capacitor—Silvered mica, 150 mmf. (C1, C2)
71613	Capacitor—Mica, 640 mmf. (C3)
70623	Capacitor—Tubular, .0025 mfd., 600 volts (C8, C11, C33)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C16, C17)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C10, C12)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C14, C18, C31)
71135	Capacitor—Tubular, .015 mfd., 600 volts (C19)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C6)
37888	Capacitor—Comprising 2 sections 15 mfd., 450 volts, and 1 section 40 mfd., 25 volts (C30A, C30B, C30C)
71633	Coil—"A" band oscillator coil (L4)
71632	Coil—"C" band antenna coil (L2, L3)
71634	Coil—"C" band oscillator coil (L5)
71600	Condenser—Variable tuning condenser (C21, C22)
70342	Control—Volume control and power switch (R20, S4)
32634	Cord—Drive cord (approx. 45" overall length)
71609	Drum—Drive drum
72069	Grommet—Rubber grommet for rear mounting feet
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate
38832	Plug—Pin plug for loop lead
12493	Plug—Speaker cable plug, 5 contact (female)
36230	Pulley—Drive cord pulley mounted on dial bracket
71611	Resistor—470 ohms, 2 watt (R12)
14250	Resistor—8,200 ohms, ½ watt (R14)
3219	Resistor—18,000 ohms, ½ watt (R17)
30492	Resistor—22,000 ohms, ½ watt (R3)
48925	Resistor—22,000 ohms, 2 watt (R2)
30409	Resistor—27,000 ohms, ½ watt (R16, R19)
3252	Resistor—100,000 ohms, ½ watt (R4)
30180	Resistor—120,000 ohms, ½ watt (R18)
30651	Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11)
30648	Resistor—470,000 ohms, ½ watt ((R10, R13)
30649	Resistor—2.2 megohms, ½ watt (R1, R5)
30992	Resistor—10 megohms, ½ watt (R9, R15)
71604	Shaft—Tuning shaft
35787	Socket—Input socket
30868	Socket—Motor cable socket, 2 contact (female)
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket
31418	Spring—Indicator cord tension spring
71602	Switch—Range switch (S1, S2)
71603	Switch—Tone control switch (S3)
71625	Transformer—First I-F transformer T2 (L6, L7, C25, C26)
71631	Transformer—Second I-F transformer T3 (L8, L9, C27, C28, C29)
31380	Transformer—Power transformer 117 volts, 60 cycle (T1)
35969	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES (92566-1W) (RL70R2)
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
12079	Coil—Field coil—1,060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
71560	Plug—5 prong male plug for speaker
71148	Speaker—12" E. M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T4)
	SPEAKER ASSEMBLIES 92512-1K
70574	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker cable
71148	Speaker—12" E. M. speaker complete with cone and voice coil less output transformer and plug
37899	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
71859	Bar—Grille bar
70545	Bracket—Antenna loop mounting bracket complete with spring (2 required)
71819	Bracket—Door check mounting bracket
36461	Button—Plug button
38684	Capacitor—Mica trimmer 2-20 mmf. (C32)
71820	Check—Radio compartment door check assembly less spring
X1615	Cloth—Grille cloth for walnut instruments
X1647	Cloth—Grille cloth for blonde instruments
X1663	Cloth—Grille cloth for mahogany instruments
70547	Cover—Compartment lead cover
71769	Decal—Control function decal for walnut or mahogany instruments
72825	Decal—Control function decal for blonde instruments
71768	Decal—Trade mark decal
71817	Dial—Glass dial scale
71816	Escutcheon—Dial scale escutcheon less dial
11889	Grommet—Rubber grommet to cushion chassis front apron (2 required)
71764	Hinge—Cabinet door hinge (2 required)
13103	Jewel—Pilot lamp cap
71822	Knob—Range switch or tone switch knob for walnut or mahogany instruments
72824	Knob—Range switch or tone switch knob for blonde instruments
71821	Knob—Volume control or tuning knob for walnut or mahogany instruments
72800	Knob—Volume control or tuning knob for blonde instruments
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
71813	Loop—Antenna loop complete (L1, C32)
71815	Mounting—One set of hardware to mount record changer —consisting of four springs, two spring washers and two rubber washers
71858	Pull—Door pull
37800	Shade—Compartment lamp shade
36422	Socket—3 contact socket (female) for loop leads
71818	Spring—Door check spring
30900	Spring—Retaining spring for knobs
71765	Support—Cabinet lid support and hinge
71814	Washer—Rubber washer for door check

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

2nd Production—Replacement Parts—Chassis No. RC-606C

For Record Changer Parts refer to Service Data for Model 960260-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-606C)
71601	Board—"Ant. ground" board
71606	Bracket—Dial bracket with drive cord pulley (L. H.)
71605	Bracket—Dial bracket with drive cord pulley (R. H.)
71615	Capacitor—Ceramic, 27 mmf. (C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71610	Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24)
71614	Capacitor—Ceramic, 120 mmf. (C5, C13)
39632	Capacitor—Silvered mica, 150 mmf. (C1, C2)
71613	Capacitor—Mica, 640 mmf. (C3)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C33)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C8, C11)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C16, C17)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C12)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C14, C31)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C18, C19)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7)
71976	Capacitor—Comprising 1 section 20 mfd. 450 volts, 1 section 30 mfd. 350 volts and 1 section 20 mfd. 25 volts (C30A, C30B, C30C)
71633	Coil—"A" band oscillator coil (L4)
71632	Coil—"C" band antenna coil (L2, L3)
71634	Coil—"C" band oscillator coil (L5)
71600	Condenser—Variable tuning condenser (C21, C22)
70342	Control—Volume control and power switch (R20, S4)
72953	Cord—Drive cord (approx. 45" overall length)
71609	Drum—Drive drum
72069	Grommet—Rubber grommet for rear mounting feet
70930	Grommet—Rubber grommet for mounting tuning condenser
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate
38832	Plug—Pin plug for loop lead
12493	Plug—Speaker cable plug, 5 contact (female)
72602	Pulley—Drive cord pulley mounted on dial bracket
	Resistor—330 ohms, 1 watt (R12)
	Resistor—2,200 ohms, 2 watt (R23)
	Resistor—8,200 ohms, ½ watt (R14)
	Resistor—15,000 ohms, 2 watt (R2)
	Resistor—18,000 ohms, ½ watt (R17)
	Resistor—22,000 ohms, ½ watt (R3)
	Resistor—27,000 ohms, ½ watt (R4, R16, R19)
	Resistor—56,000 ohms, ½ watt (R21)
	Resistor—100,000 ohms, ½ watt (R22)
	Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11)
	Resistor—470,000 ohms, ½ watt (R10, R13, R18)
	Resistor—2.2 megohms, ½ watt (R1, R5)
	Resistor—10 megohms, ½ watt (R9, R15)
71604	Shaft—Tuning shaft
35787	Socket—Input socket
30868	Socket—Motor cable socket, 2 contact (female)
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket
31418	Spring—Indicator cord tension spring
71602	Switch—Range switch (S1, S2)
71603	Switch—Tone control switch (S3)
70128	Transformer—First I-F transformer T2
70129	Transformer—Second I-F transformer T3
70127	Transformer—Power transformer, 117 volts, 60 cycle (T1)
35969	Washer—"C" washer for tuning shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES 92569-1W—RL103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71859	Bar—Grille bar
71819	Bracket—Door check mounting bracket
36461	Button—Plug button
38684	Capacitor—Mica trimmer, 2-20 mmf. (C32)
71820	Check—Radio compartment door check assembly less spring
X1615	Cloth—Grille cloth for walnut instruments
X1647	Cloth—Grill cloth for blonde instruments
X1663	Cloth—Grille cloth for mahogany instruments
70547	Cover—Compartment lead cover
71769	Decal—Control function decal for walnut or mahogany instruments
72825	Decal—Control function decal for blonde instruments
71768	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
71817	Dial—Glass dial scale
71816	Escutcheon—Dial scale escutcheon less dial
11889	Grommet—Rubber grommet to cushion chassis front apron (2 required)
72069	Grommet—Rubber grommet for mounting loop
71764	Hinge—Cabinet door hinge (2 required)
13103	Jewel—Pilot lamp cap
71822	Knob—Range switch or tone switch knob for walnut or mahogany instruments
72824	Knob—Range switch or tone switch knob for blonde instruments
71821	Knob—Volume control or tuning knob for walnut or mahogany instruments
72800	Knob—Volume control or tuning knob for blonde instruments
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
71813	Loop—Antenna loop complete (L1, C32)
71815	Mounting—One set of hardware to mount record changer—consisting of four springs, two spring washers and two rubber washers
71858	Pull—Door pull
72324	Shade—Compartment lamp shade
36422	Socket—3 contact socket (female) for loop leads
71818	Spring—Door check spring
30900	Spring—Retaining spring for knobs
71765	Support—Cabinet lid support and hinge
71814	Washer—Rubber washer for door check

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Substitute Speaker:

SPEAKER ASSEMBLIES
92569-1W2

13867	Cap—Dust cap
72828	Cone—Cone and voice coil assembly
71560	Plug—5-Prong male plug for speaker
71145	Suspension—Metal cone suspension
73242	Transformer—Output transformer

RCA VICTOR

AM-FM Radio Receiver

MODELS 68R1, 68R2, 68R3, 68R4

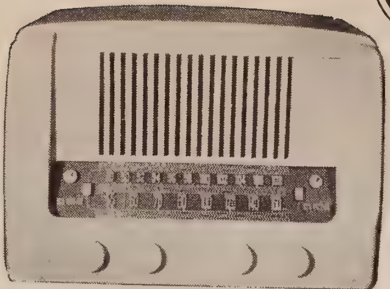
Chassis No. RC-608—Mfr. No. 274

SERVICE DATA

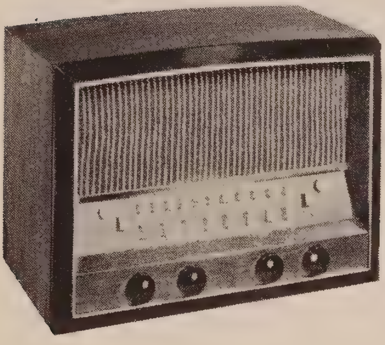
—1946 No. 7—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

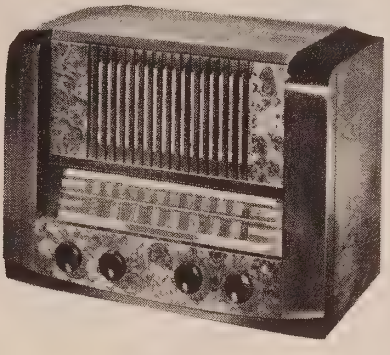
68R1



68R2



68R3



68R4

Electrical and Mechanical Specifications

Frequency Range

Broadcast ("A" Band)	540-1600 kc.
Frequency Modulation (FM Band)	88-108 mc.

Intermediate Frequency

Broadcast	455 kc.
Frequency Modulation	10.7 mc.

Tube Complement

(1) RCA 6BE6	1st Det. & Osc. FM
(2) RCA 6BE6	1st Det. & Osc. AM
(3) RCA 6BA6	I-F Amplifier
(4) RCA 6AU6	Driver
(5) RCA 6AL5	Ratio Detector
(6) RCA 6SQ7	2nd Det., A.V.C., and A-F Amplifier
(7) RCA 6K6 GT	Power Output
(8) RCA 5Y3 GT	Rectifier

Power Supply Rating

105-125 volts, 60 cycles . . . . . 64 watts

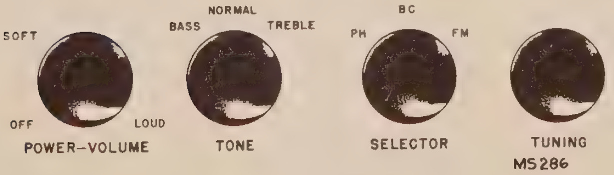
Pilot Lamps . . . . . (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker 940923-7

Size	5" x 7" elliptical PM
V.C. Impedance	3.4 ohms at 400 cycles

Power Output

Undistorted	2.0 watts
Maximum	4.0 watts



FRONT PANEL CONTROLS

Circuit Description

These receivers are eight tube, table model, superhetrodyne radios, incorporating two separate converters, one for the FM band and the other for the broadcast band. The range switch has a position in which these models can be operated as a phonograph sound channel.

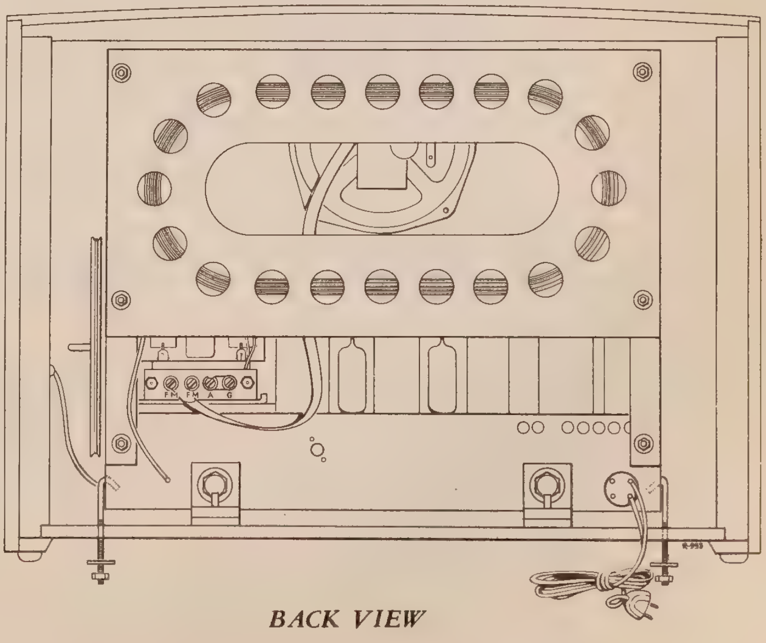
Ratio Detector—

These sets utilize a FM detector known as the "Ratio Detector." This type of circuit eliminates the necessity for a limiting stage preceding the detector, and has an inherent insensitivity to amplitude modulated signals. It is desirable, that before attempting to service these receivers, that this type of circuit be completely understood. Special care should be taken in alignment, and all precautions should be carefully observed.
A complete description of the ratio detector circuit will be found in RCA Victor Supplement No. 10.

Note:—Two antennas, a loop for broadcast reception and a folded dipole for FM, are contained in the cabinet. Because of the directional characteristic of these antennas, it may be necessary, when interference is encountered, to rotate the cabinet until a point of minimum interference is found. In some locations, a phenomenon known as "Multi-Path Reception" exists which produces distortion on FM. This is not a fault of the receiver. If this condition is suspected, remove the set to another location, and check it there. An external FM antenna, such as the RCA Dipole and Reflector, Stock #225, will eliminate, or appreciably reduce this effect.

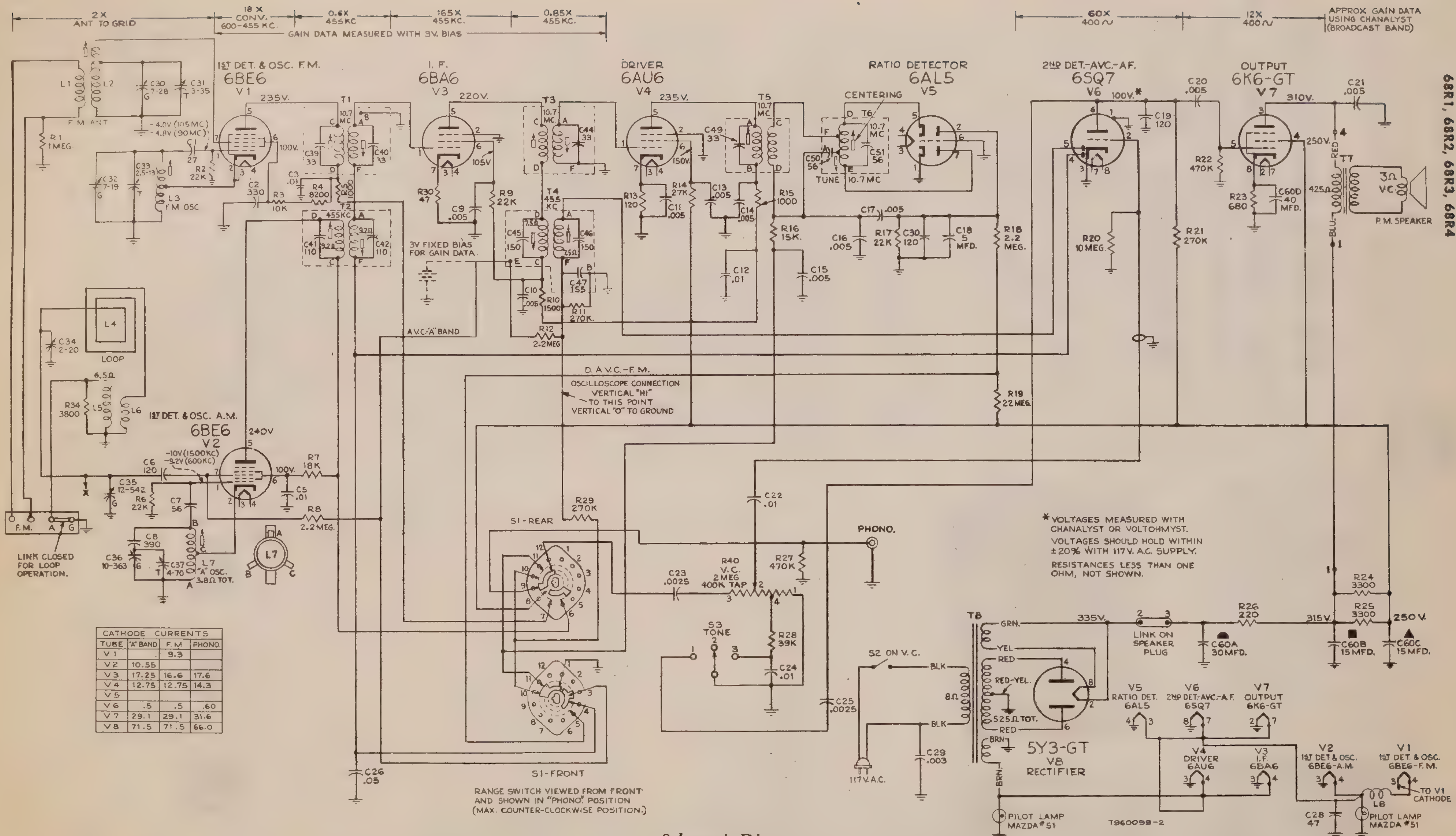
Standard Broadcasts—

To install an external antenna for Standard Broadcasts, the link on the terminal board on the chassis in the back of the cabinet must be opened. Then connect the antenna, which should be a wire 40 to 60 feet long, to the terminal marked "A". A connection from "G" to ground should not be necessary but may be advantageous.



BACK VIEW

68R1, 68R2, 68R3, 68R4


2X ANT TO GRID
18X CONV. 600-455 KC.
0.6X 455KC
165X 455KC.
0.85X 455KC.
GAIN DATA MEASURED WITH 3V. BIAS
60X 400∿
12X 400∿
APPROX GAIN DATA USING CHANALYST (BROADCAST BAND)
1ST DET. & OSC. F.M. 6BE6 V1
I. F. 6BA6 V3
DRIVER 6AU6 V4
RATIO DETECTOR 6AL5 V5
2ND DET.-AVC.-AF. 6SQ7 V6
OUTPUT 6K6-GT V7
5Y3-GT V8 RECTIFIER
1ST DET. & OSC. A.M. 6BE6 V2
F.M. ANT
LOOP
L4
L7
CENTERING
TUNE
P.M. SPEAKER
3Ω VC
T7
T8
3V FIXED BIAS FOR GAIN DATA.
A.V.C.-"A" BAND
D. A.V.C.-F.M.
OSCILLOSCOPE CONNECTION VERTICAL "HI" TO THIS POINT VERTICAL "O" TO GROUND
S1-REAR
S1-FRONT
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "PHONO" POSITION (MAX. COUNTER-CLOCKWISE POSITION.)
PHONO.
R40 V.C. 2MEG 400K TAP
S3 TONE
S2 ON V.C.
117V.A.C.
LINK ON SPEAKER PLUG
LINK CLOSED FOR LOOP OPERATION.
*VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY.
RESISTANCES LESS THAN ONE OHM, NOT SHOWN.
PILOT LAMP MAZDA #51
TO V1 CATHODE
T960099-2

CATHODE CURRENTS			
TUBE	"A" BAND	F. M	PHONO.
V 1		9.3	
V 2	10.55		
V 3	17.25	16.6	17.6
V 4	12.75	12.75	14.3
V 5			
V 6	.5	.5	.60
V 7	29.1	29.1	31.6
V 8	71.5	71.5	66.0

Schematic Diagram

Critical Lead Dress

1. Dress capacitor C-1 near chassis base.
2. Dress lead from pin No. 5, No. 1 6BE6 to terminal C, of transformer T1, as near the bottom of the FM shelf as possible.
3. Dress capacitor C-23 next to chassis.
4. The lead from capacitor C-23 to the high side of the volume control must be dressed next to chassis along front apron.
5. Dress resistor R-20 near chassis base.
6. Dress all a-c leads away from volume control.
7. Solder FM antenna coil primary leads to terminal board with as short a lead length as practical.
8. Make all FM leads as short as possible. Dress of all other leads should be similar to original wiring.
9. The lead from pin No. 2, 6BA6, to ground must be dressed as close to the base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length, nor the point at which it is grounded to the chassis should be changed.

Alignment Procedure

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

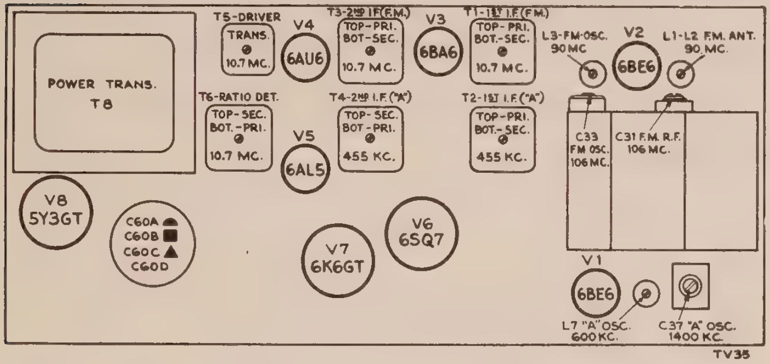
When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations, except FM IF-RF, connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Calibration Scale.—The dial scale printed in this service note (or a tracing of the scale) may be temporarily attached to the chassis for quick reference during alignment.

With gang at full mesh the pointer should be set to the reference mark at the left hand end of the dial back plate.



Tube and Trimmer Locations (Top View)

FM Ratio Detector Alignment

Range Switch in FM Position

Steps	Connect the high side of the test osc. to—	Tune test-osc. to—	Turn volume control to—	Adjust
1	Connect a 680 ohm resistor between pins 5 & 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18. The common lead of the meter to ground.			
2	Driver grid, pin 1, of the 6AU6 in series with .01 mfd.	10.7 mc. 30% mod. 400 cycles (AM) Approx. .25 Volt output	Maximum Volume	*Driver transformer, T5 for maximum d-c across C18.
3	Remove the meter leads and disconnect the 680 ohm resistor from the 6AL5. Connect two 68,000 ohms (±1%) resistors in series, across the 22,000 ohm ratio detector load resistor, R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors, and the d-c probe to terminal "A" of the ratio detector transformer, T6. Set the meter to the 0-30 VDC scale.			
4	Same as in Step 2.	Same as in Step 2. Approx. .25 Volt output.	Maximum volume.	†T6 bottom core for zero d-c balance. T6 top core for min. audio output.‡
5	Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor.			
6	Repeat Step 2.			
7	Remove ALL connections.			

*Approximately 14.5 volts.

†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

‡The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and the output meter, hooked across the voice coil, for the point at which both zero d-c and minimum a-f output occur.

Note:—Two or more points may be found which will satisfy the condition required in Step 4. T6 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and zero d-c is reached.

FM IF-RF Alignment

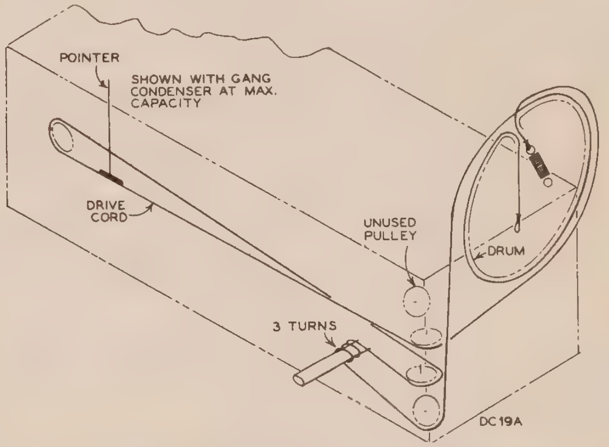
(FM Ratio Detector must be aligned first.)

RANGE SWITCH IN FM POSITION

Steps	Connect sig. gen.	Sig. gen. output	Turn radio dial to—	Adjustment for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor C18 and the common lead of the meter to chassis.			
2	High side to one FM ant. term. in series with .01 mfd. Low side to the other FM ant. term.	10.7 mc 30% modulation, 400 cycles AM. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Low frequency end (gang fully meshed)	*Using alternate loading: T3 bottom core (sec.) T3 top core (pri.) T1 bottom core (sec.) T1 top core (pri.)
3	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	106 mc	106 mc	C33 osc. C31 ant.
4		90 mc	90 mc	L3 osc. L2 ant.
5	Repeat Steps 3 and 4 until further adjustment does not improve calibration.			

*Alternate loading involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 680 ohm resistor after T3 and T1 have been aligned.

When the windings are loaded it may be necessary to increase the 10.7 mc input since the gain will decrease resulting in a small or no reading across C18. This reading should be maintained at 2-4 volts, by adjusting the input, as each transformer is aligned.



Dial-Indicator and Drive Mechanism

"A" Band Alignment*

Range Switch in BC Position

Steps	Connect the high side of the test osc. to—	Tune test osc. to—	Turn the radio dial to—	Adjust for max. peak output.
1	AM converter grid, pin 1, 6BE6 in series with .01 mfd.	455 kc.	"A" Band Quiet point at low freq. end.	†T4—Top core T4—Bottom core
2				†T2—Bottom core T2—Top core
3	Antenna lead in series with 200 mmf.	1400 kc.	"A" Band 1400 kc calibration pt.	C37—Osc. C34—Ant. (Loop)
4		600 kc.	"A" Band 600 kc calibration pt.	L7—Osc. Rock in.
5	Repeat steps 3 and 4 until aligned			
6	When chassis is installed, readjust C34 on the loop for max. output at 1400 kc.			

*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†Align T4 and T2 by means of alternate loading. Use a 47,000 ohm resistor instead of a 680 ohm resistor. Alternate loading is explained in "FM IF-RF Alignment."

Change in Parts List:

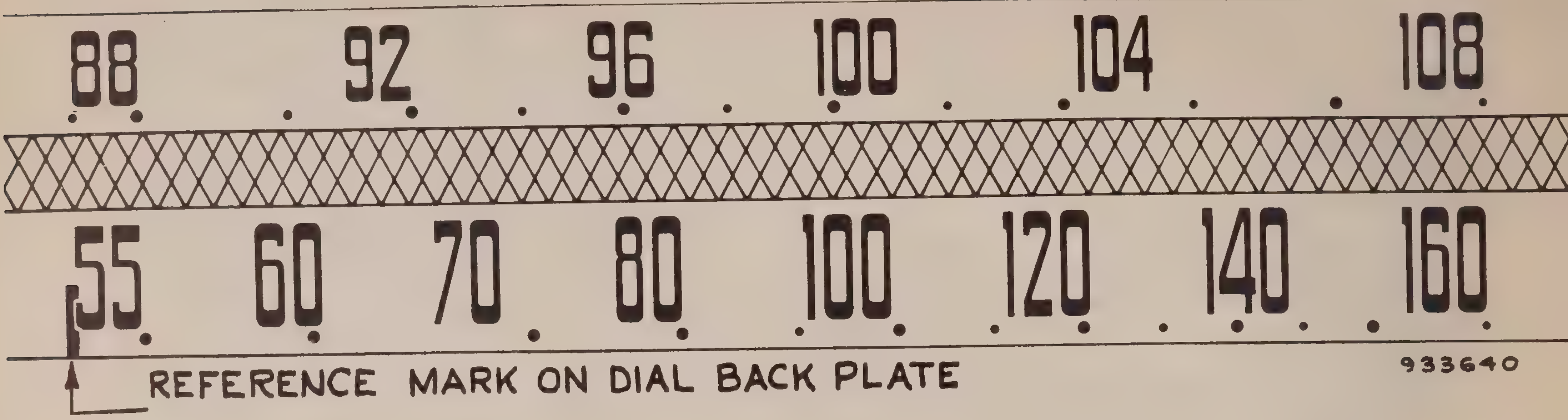
CHASSIS ASSEMBLIES

Change:

36031 Coil—. . . . to read
37962 Coil—Loop primary coil (L5, L6).

Additions to Parts List:

73088 Decal—Control marker decal, 68R1, -3, -4.
73089 Decal—Control marker decal, 68R2.



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY RC608
72058	Board—"F.M.—Antenna—Ground" board
72046	Capacitor—Mica trimmer, 2.5-13 mmf. (C33)
38357	Capacitor—Mica trimmer, 2-20 mmf. (C34)
71808	Capacitor—Mica trimmer, 3-35 mmf. (C31)
72234	Capacitor—Mica trimmer, 4-70 mmf. (C37)
72570	Capacitor—Ceramic, 27 mmf. (C1)
39042	Capacitor—Ceramic, 47 mmf. (C28)
71924	Capacitor—Ceramic, 56 mmf. (C7)
71614	Capacitor—Ceramic, 120 mmf. (C6, C19, C30)
72571	Capacitor—Mica, 330 mmf. (C2)
72639	Capacitor—Mica, 390 mmf. (C8)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C25, C23)
71087	Capacitor—Molded paper, .003 mfd., 1000 volts (C29)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C11, C15, C16, C17)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C9, C10, C13, C14)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C20)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C21)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C22, C24)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C3, C4, C5, C12)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C26)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C18)
72271	Capacitor—Electrolytic comprising (C60A, C60B, C60C, C60D) 1 section of 30 mfd., 450 volts 1 section of 15 mfd., 450 volts 1 section of 15 mfd., 350 volts and 1 section of 40 mfd., 25 volts
72335	Coil—F.M. Antenna Coil (L1, L2)
72336	Coil—F.M. Oscillator Coil (L3)
72574	Coil—Filament choke Coil (L8)
36031	Coil—Loop primary Coil (L5, L6)
72333	Coil—Oscillator Coil—"A" band (L7)
72059	Condenser—Variable tuning condenser, less mounting bracket and trimmers (C32, C35, C36, C61)
38404	Control—Volume control and power switch (R40, S2)
72953	Cord—Drive cord—(250 ft. reel)
	NOTE: Approx. 65 in. overall length required, order specified length from your distributor.
70392	Cord—Power cord
71799	Grommet—Rubber grommet for mounting R.F. shelf (3 req'd)
72069	Grommet—Rubber grommet for rear mounting feet (2 req'd)
72061	Indicator—Station selector indicator
72159	Loop—Antenna loop complete (L4, L5, L6, C34, R34)
72142	Plate—Dial back plate complete with pulleys
12493	Plug—5 contact female plug for speaker cable
36230	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R30)
30189	Resistor—120 ohms, ½ watt (R13)
53005	Resistor—220 ohms, 2 watts (R26)
19233	Resistor—680 ohms, 1 watt (R23)
34766	Resistor—1000 ohms, ½ watt (R5, R15)
72762	Resistor—1500 ohms, 1 watt (R10)
19525	Resistor—3300 ohms, 2 watts (R24, R25)
38888	Resistor—8200 ohms, 1 watt (R4)
71914	Resistor—10,000 ohms, 1 watt (R3)
36714	Resistor—15,000 ohms, ½ watt (R16)
39158	Resistor—18,000 ohms, 2 watts (R7)
71989	Resistor—22,000 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ½ watt (R2, R6, R17)
30409	Resistor—27,000 ohms, ½ watt (R14)
30147	Resistor—39,000 ohms, ½ watt (R28)
30651	Resistor—270,000 ohms, ½ watt (R11, R21, R29)
30648	Resistor—470,000 ohms, ½ watt (R22, R27)
30652	Resistor—1 megohm, ½ watt (R1)
30649	Resistor—2.2 megohms, ½ watt (R8, R12, R18)
30992	Resistor—10 megohms, ½ watt (R20)
71917	Resistor—22 megohms, ½ watt (R19)
72055	Shaft—Tuning knob shaft
35787	Socket—Input socket, Phono.
31364	Socket—Lamp socket
72516	Socket—Tube socket—miniature
31251	Socket—Tube socket—Octal
31418	Spring—Tension spring for drive cord
72060	Switch—Range switch (S1)
71603	Switch—Tone switch (S3)
71625	Transformer—First I.F. Transformer—A.M. (T2, C41, C42)
72593	Transformer—First I.F. Transformer—F.M. (T1, C39, C40)
71631	Transformer—Second I.F. Transformer—A.M. (T4, C45, C46, C47)
72723	Transformer—Second I.F. Transformer—F.M. (T3, C44)
71935	Transformer—Driver transformer (T5, C49)
71975	Transformer—Power transformer—117 volt, 60 cycle (T8)
71934	Transformer—Ratio detector transformer (T6, C50, C51)
35969	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 92573-1K
72728	Cone—Cone and voice coil assembly
31539	Plug—5 prong male plug for speaker
72332	Transformer—Output transformer (T7)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
71864	Antenna—Di-pole antenna
72537	Back—Cabinet back for Model 68R1
72538	Back—Cabinet back for Model 68R2
72509	Back—Cabinet back for Model 68R3, 68R4
72539	Baffle—Baffle and grille assembly for 68R1, 68R2
Y1396	Cabinet—Brown plastic cabinet for Model 68R1
Y1397	Cabinet—Ivory plastic cabinet for Model 68R2
72536	Clip—Spring clip for dial (1 set) for 68R1 and 68R2
72337	Clip—Spring clip for dial for 68R3, 68R4
X1631	Cloth—Grille cloth for 68R3
X1644	Cloth—Grille cloth for 68R4
72653	Dial—Glass dial scale for 68R1, 68R2, 68R3
72813	Dial—Glass dial scale for 68R4
36153	Fastener—Push fastener for cabinet back for 68R1, 68R2
71595	Feet—Rubber feet (4 req'd) for 68R3, 68R4
71821	Knob—Control knob—maroon for Model 68R1, 68R3, 68R4
70474	Knob—Control knob—ivory—for Model 68R2
11765	Lamp—Dial lamp—Mazda No. 51
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

QU72, QU72A

RCA MODELS QU72, QU72A

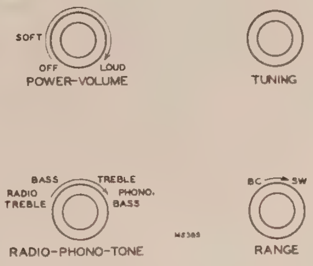
Radio-Phonograph Combinations

Chassis No. RC-1035 Mfr. No. 274

Service Data

1947....X4

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



Front Panel Controls

Electrical and Mechanical Specifications

Frequency Range

Standard Broadcast (A Band)	540-1600 kc (556-187 m)
Short Wave (C Band)	5.8-18.2 mc (51.8-16.5 m)
Intermediate Frequency	455 KC

Tube Complement:

(1) RCA—12SA7	1st Det. Oscillator
(2) RCA—12SK7	I.F. Amplifier
(3) RCA—12SQ7	2nd Det. AVC. and 1st A.F. Amplifier
(4) RCA—50L6GT	Power Output
(5) RCA—35Z5GT	Rectifier

Power Output Rating:

Undistorted	.75 Watts
Maximum	1.5 Watts

Loudspeaker:

Size	4 x 6 inch
V.C. impedance at 400 cycles	3.4 Ohms

Power Supply Ratings:

QU72	105-125 Volts 50-60 cycles*	42 W (measured at 117V)
QU72A	210-250 Volts 50-60 cycles*	50 W (measured at 234V)

*See note on conversion spring.

Lubrication

Motor:

The bearings of the motors furnished in these instruments are lubricated at the factory and should require no further lubrication for a period of at least one year. When lubrication is required, apply a few drops of any good grade of S.A.E. No. 10 oil to the bearing felts.

Turntable Spindle:

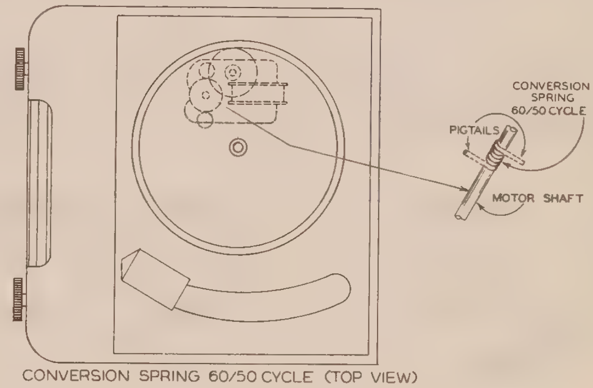
When lubrication is required, apply one or two drops of Gargoyle 600W to the bearing.

Drive Wheel:

Apply one or two drops of any good grade of S.A.E. No. 10 oil to the bearing felt.

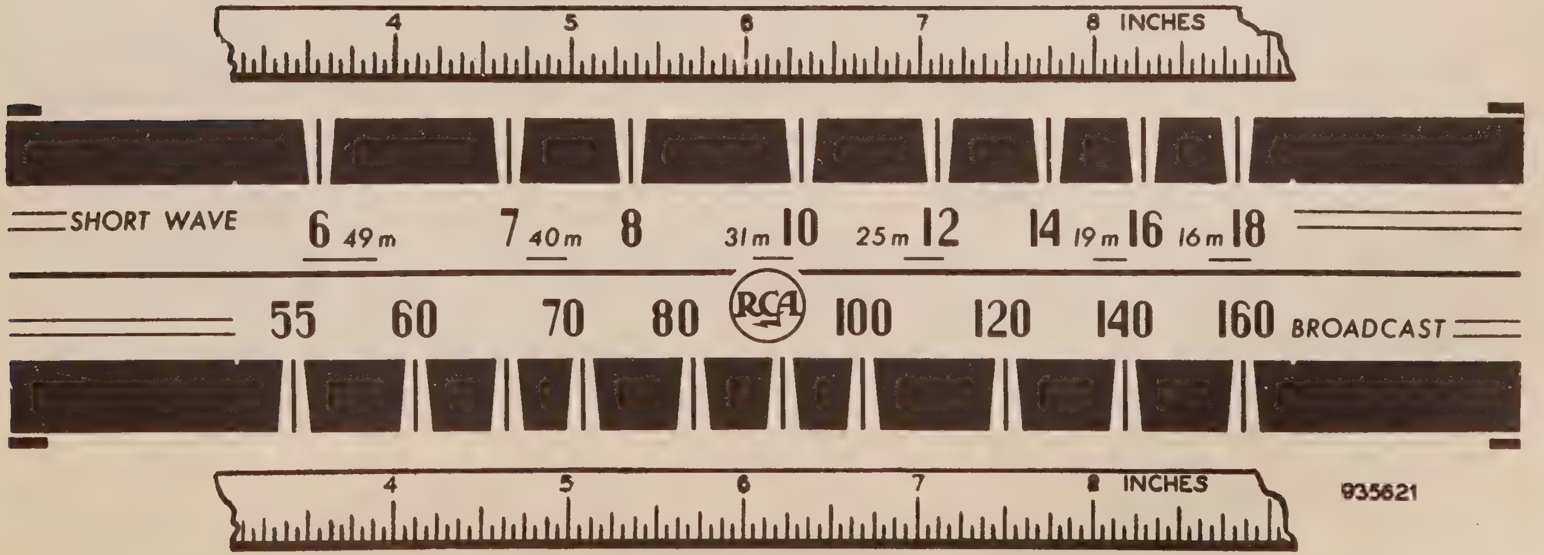
CAUTION:

Exercise extreme care to prevent getting any oil on the rubber tire or on the motor shaft. Oil on these parts will cause slippage with resultant irregular turntable speed.



CONVERSION SPRING 60/50 CYCLE (TOP VIEW)

On instruments having motors stamped 970472-1, it is possible to convert these instruments to 117 volt 50 cycle operation. A conversion spring, stock number 72689, is placed over the motor shaft, as shown in the illustration, increasing the diameter of the shaft, and compensating for the decreased motor speed at 50 cycles. These springs may be supplied with pigtails to aid in installation. After the spring has been placed on the shaft, clip the pigtails so they do not interfere with the drive wheel.



Reduced Reproduction of Receiver Dial, QU72, QU72A, and Corresponding Rule Scales

The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of 4⅛" from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

***Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Alignment.—With the gang condenser in full mesh, the pointer should be set 3$\frac{3}{32}$" from the left edge of the dial back plate. This point corresponds to the first mark on the dial scale to the left of "550" kc. on "A" band. To find any calibration point it is necessary to draw a line on the dial scale drawing through the desired freq., so that the line passes through the same reading on the top and bottom rule scales. For instance, 1300 kc. on "A" band will correspond to a dial indicator setting of 7$\frac{7}{8}$" from the LEFT EDGE of the dial back plate. Move the indicator the desired distance by turning the tuning knob. ONCE THE INDICATOR HAS BEEN SET AT FULL MESH, MOVE THE INDICATOR ONLY BY TURNING THE TUNING KNOB.

Dial Indicator Adjustment.—After the set has been aligned, replace it in the cabinet. Turn the tuning knob until the condenser is in full mesh. The indicator should now be under the first mark on the dial scale face to the left of "550" kc on "A" band. If it is not, the calibration should be rechecked.

Alignment.—The most satisfactory method of aligning or checking the short-wave range is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil, L5, so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce inaccuracy on the band dial. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

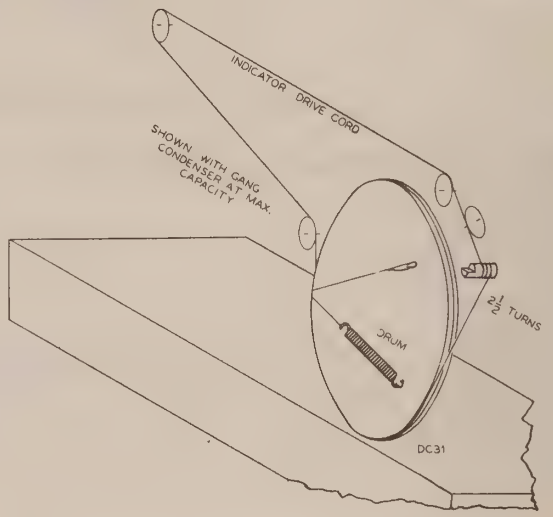
1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil should be retouched so that the stations come in at the correct points on the dial.

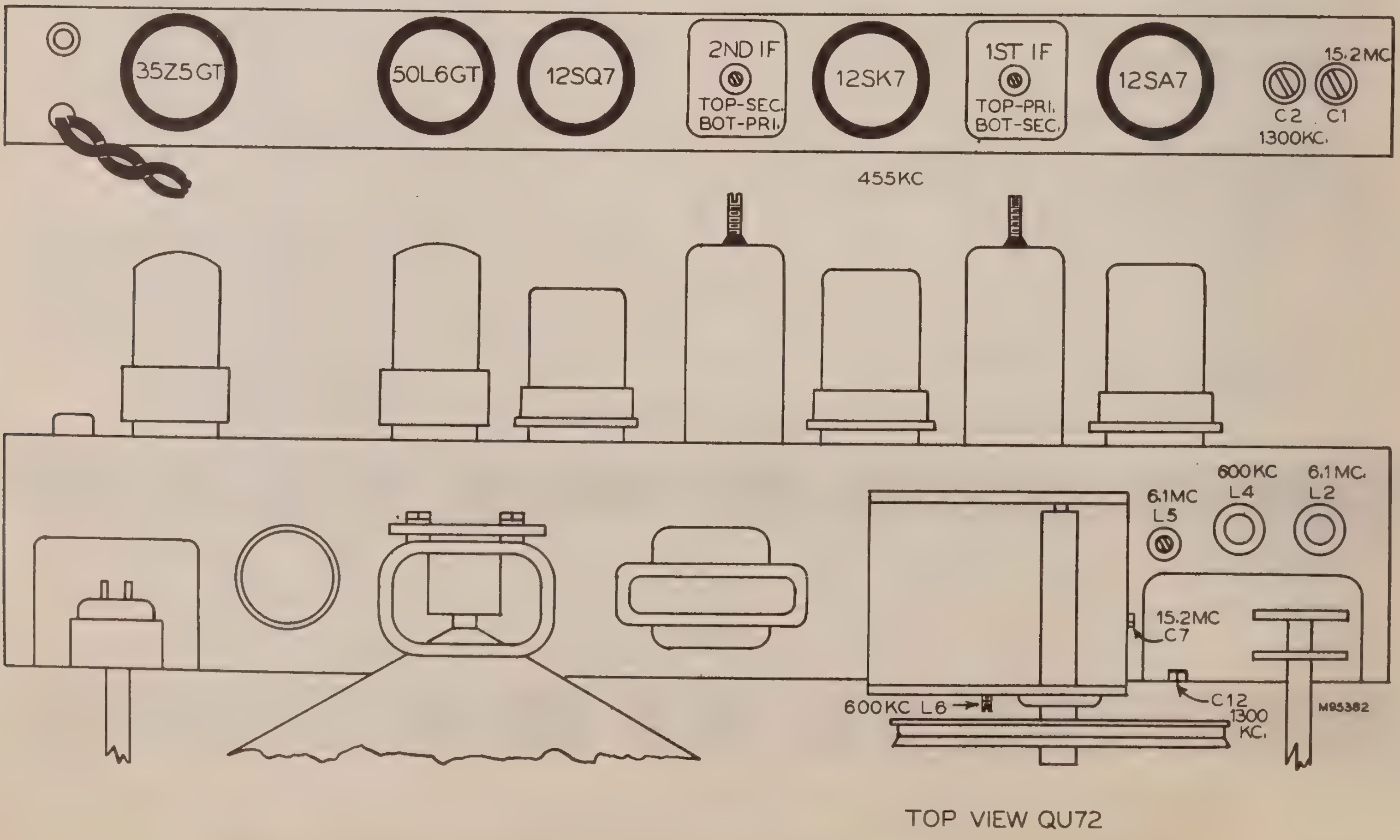
For additional information, refer to booklet "RCA Victor Receiver Alignment."

***Caution:** This is an AC-DC type chassis with one side of the power line connected to the metal base, which is also—B. Connection from the signal generator must have a large (.1 MFD) capacitor in the ground side to prevent damage to the generator attenuator, unless the power source to the receiver is isolated from ground.

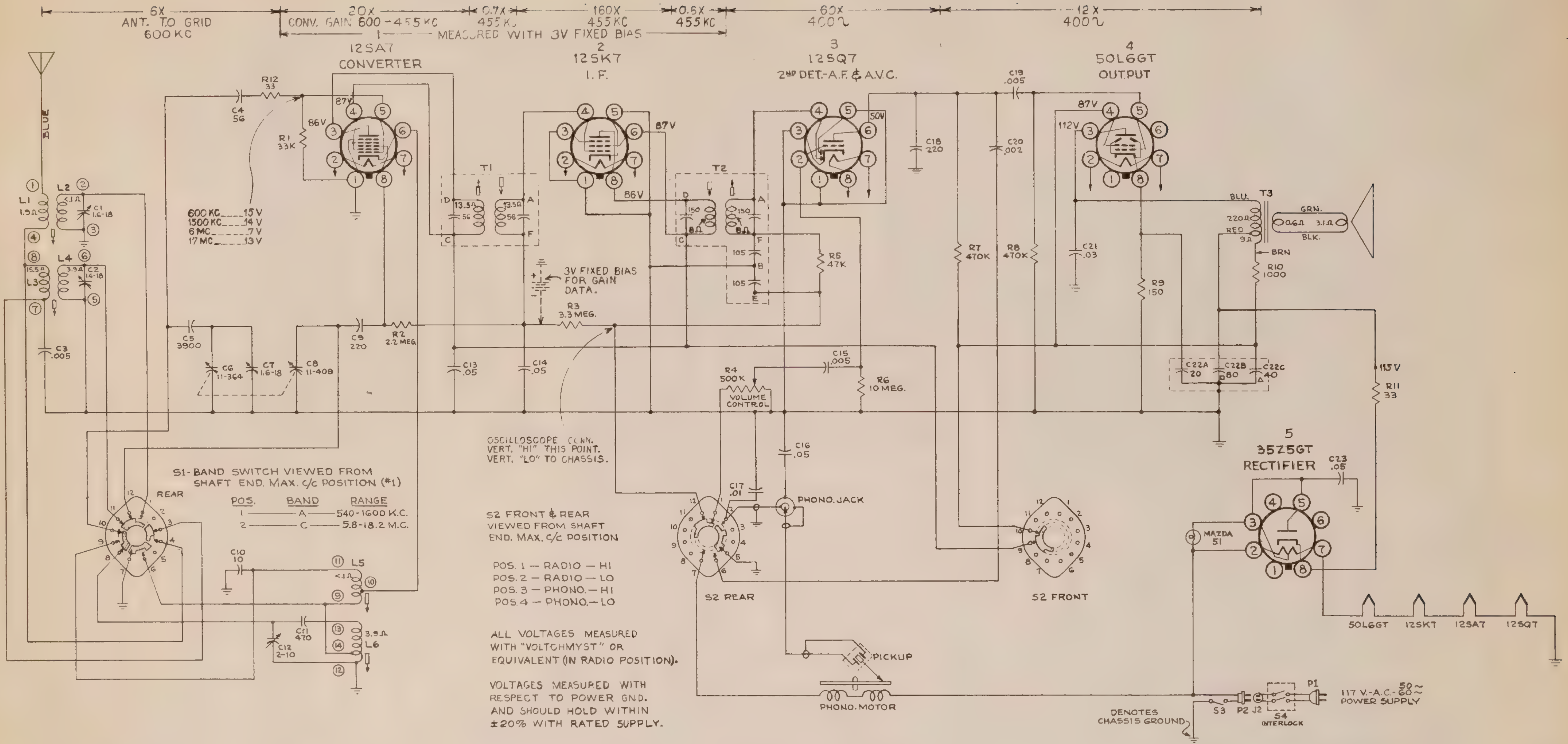
Step	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Turn radio dial to	Adjust for max. peak output—
1	12SK7 IF grid in series with .01 mfd.	455 kc	"A"	Quiet point, low end of dial	T2—Top core T2—Bot. core
2	12SA7 IF grid in series with .01 mfd.				T1—Bot. core T1—Top core
3	Ant. lead in series with 300 Ω	15.2 mc	"C"	15.2 mc	C7—Osc. C1—Ant.
4		6.1 mc		6.1 mc	L5—Osc. L2—Ant.
5	Repeat steps 3 and 4.				
6	Ant. lead in series with 200 mmfd.	1300 kc	"A"	1300 kc	C12—Osc. C2—Ant.
7		600 kc		600 kc	L6—Osc. L4—Ant.
8	Repeat steps 6 and 7.				

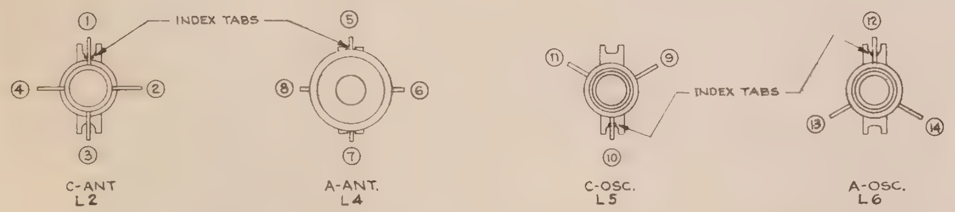


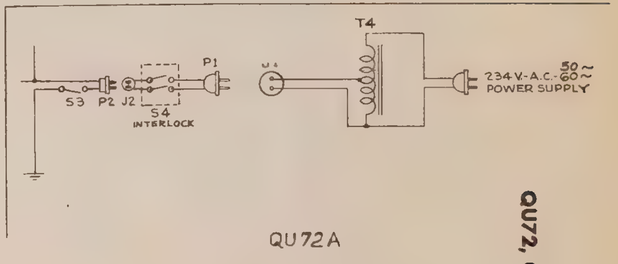
Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations


6X ANT. TO GRID 600 KC
20X CONV. GAIN 600-455 KC
0.7X 455 KC
160X 455 KC
0.6X 455 KC
MEASURED WITH 3V FIXED BIAS
60X 400~
12X 400~
12SA7 CONVERTER
2 12SK7 I.F.
3 12SQ7 2ND DET.-A.F. & A.V.C.
4 50L6GT OUTPUT
5 35Z5GT RECTIFIER
BLUE
L1 1.9Ω
L2 <.1Ω
L3 15.5Ω
L4 3.9Ω
C1 1.6-18
C2 1.6-18
C3 .005
C4 56
R12 33
R1 33K
87V
86V
600 KC 15 V
1500 KC 14 V
6 MC 7 V
17 MC 13 V
C5 3900
C6 11-364
C7 1.6-18
C8 11-408
C9 220
R2 2.2 MEG.
T1
13.5Ω
56
T2
150
8Ω
105
3V FIXED BIAS FOR GAIN DATA.
R3 3.3 MEG.
C13 .05
C14 .05
50V
R5 47K
C15 .005
R4 500K VOLUME CONTROL
R6 10 MEG.
C16 .05
C17 .01
PHONO. JACK
C18 220
C19 .005
C20 .002
R7 470K
R8 470K
112V
C21 .03
R9 150
T3
BLU.
220Ω
RED
9Ω
BRN
GRN.
0.6Ω
3.1Ω
BLK.
R10 1000
C22A 20
C22B 80
C22C 40
115V
R11 33
C23 .05
MAZDA 51
50L6GT
12SK7
12SA7
12SQ7
OSCILLOSCOPE CONN. VERT. "HI" THIS POINT. VERT. "LO" TO CHASSIS.
S1-BAND SWITCH VIEWED FROM SHAFT END. MAX. c/c POSITION (#1)
REAR
POS. BAND RANGE
1 A 540-1600 K.C.
2 C 5.8-18.2 M.C.
C10 10
L5
<.1Ω
C11 470
C12 2-10
3.9Ω
L6
S2 FRONT & REAR VIEWED FROM SHAFT END. MAX. c/c POSITION
POS. 1 — RADIO — HI
POS. 2 — RADIO — LO
POS. 3 — PHONO. — HI
POS. 4 — PHONO. — LO
S2 REAR
S2 FRONT
ALL VOLTAGES MEASURED WITH "VOLTOHMYST" OR EQUIVALENT (IN RADIO POSITION).
VOLTAGES MEASURED WITH RESPECT TO POWER GND. AND SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.
PICKUP
PHONO. MOTOR
DENOTES CHASSIS GROUND
S3
P2
J2
S4 INTERLOCK
P1
117 V.-A.C.-50~ 60~ POWER SUPPLY


INDEX TABS
C-ANT L2
A-ANT. L4
INDEX TABS
C-OSC. L5
A-OSC. L6


T4
P1
S3
P2
J2
S4 INTERLOCK
234 V.-A.C.-50~ 60~ POWER SUPPLY
QU72A

Speaker Mounting:

This instrument was originally designed to have the speaker mounted on the chassis as illustrated. In actual production the speaker is fastened to the cabinet using 2 rubber grommets, spacers and wood screws; a clamp and rubber cushion is used to hold the bottom of the speaker in place. Replacement Speakers (Stock No. 71058) (Stamped 922258-2) do not have the two large holes in the speaker rim required for the two grommets. A replacement speaker available as Stock No. 73043 (Stamped 92576-1) requires the addition of a rubber gasket which can be obtained from the original speaker.

Chassis Removal Caution:

Before removing or reinstalling the chassis in the cabinet, turn the tuning control to the extreme low frequency end so that the plates of the tuning condenser are fully meshed.

REPLACEMENT OF SAPPHIRE

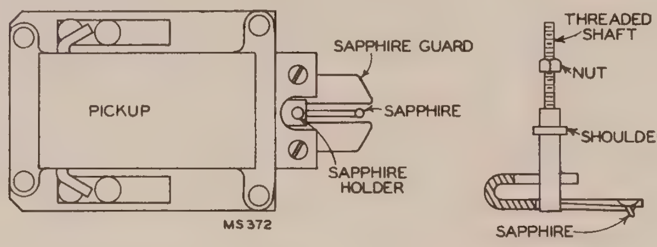
CAUTION: Never bend the sapphire support wire.

The nut on the sapphire holder assembly may be locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft if cement has been used. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020") beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

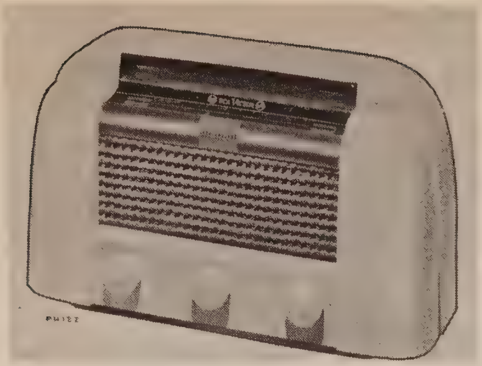


Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1035
72277	Capacitor—Mica trimmer, dual, 1.6-18 mmf. (C1, C2)
70367	Capacitor—Mica trimmer, 2-10 mmf. (C12)
72615	Capacitor—Mica, 10 mmf. (C10)
39622	Capacitor—Mica, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C9, C18)
72814	Capacitor—Ceramic, 470 mmf. (C11)
72637	Capacitor—Mica, 3900 mmf. (C5)
72839	Capacitor—Molded paper, .002 mfd., 400 volts (C20)
71699	Capacitor—Molded paper, .005 mfd., 400 volts (C3, C15, C19)
72838	Capacitor—Molded paper, .01 mfd., 400 volts (C17)
72815	Capacitor—Molded paper, .03 mfd., 400 volts (C21)
72837	Capacitor—Molded paper, .05 mfd., 400 volts (C13, C14, C16, C23)
72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C22A, C22B, C22C)
72276	Coil—Antenna coil, "C" band (L1, L2)
72275	Coil—Antenna coil, "A" band (L3, L4)
72274	Coil—Oscillator coil, "C" band (L5)
72273	Coil—Oscillator coil, "A" band (L6)
72278	Condenser—Variable tuning condenser (C6, C7, C8)
38410	Control—Volume control and power switch (R4, S3)
32634	Cord—Drive cord (approx. 49" overall length) NOTE: Before assembling, stretch to full length
70384	Drum—Drive drum
71851	Grommet—Rubber grommet for mounting tube socket
72283	Grommet—Rubber grommet for mounting tuning condenser or speaker
72544	Indicator—Station selector indicator
70391	Insulator—Phono input socket insulator
11765	Lamp—Dial lamp, Mazda No. 51
72272	Plate—Dial back plate complete with drive cord pulleys
30868	Plug—2 contact female plug for motor cable
30870	Plug—2 prong male plug for interlock switch (P2)
30789	Resistor—33 ohms, ½ watt (R12)
71290	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ½ watt (R9)
71916	Resistor—1000 ohms, 1 watt (R10)
30685	Resistor—33,000 ohms, ½ watt (R1)
30787	Resistor—47,000 ohms, ½ watt (R5)
30648	Resistor—470,000 ohms, ½ watt (R7, R8)
30649	Resistor—2.2 megohms, ½ watt (R2)
31417	Resistor—3.3 megohms, ½ watt (R3)
30992	Resistor—10 megohms, ½ watt (R6)
72282	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket, moulded
31319	Socket—Tube socket, wafer
70390	Spring—Drive cord spring
72280	Switch—Radio-phono switch (S2)
72279	Switch—Range switch (S1)
72545	Transformer—First I. F. transformer (T1)
70918	Transformer—Second I. F. transformer (T2)
72296	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES RMP 124
72284	Arm—Pickup arm shell only
72288	Arm—Pivot arm and shaft
72285	Base—Pickup arm mounting base
72289	Bracket—Pickup arm mounting bracket
72592	Cable—Shielded pickup cable complete with pin plug
39851	Crystal—Crystal cartridge
38452	Guard—Needle guard
72290	Pin—Pivot pin to hold mounting bracket to pivot arm
31048	Plug—Pin plug for pickup cable
70341	Nut—Mounting nut and washer for sapphire
34311	Ring—Mounting base retaining ring
39863	Sapphire—Sapphire and holder
37763	Screw—#2-56 x ⅛" screw to mount guard (2 required)
4388	Screw—#6-32 x 5/16" set screw to hold pivot pin
72286	Spacer—One set of spacers for pickup arm bracket
72774	Spring—Pivot arm tension spring
	MOTOR AND TURNTABLE ASSEMBLIES Stamped 970472-1
39533	Clip—Retaining clip for idler wheel
39531	Clip—Retaining clip for turntable spindle
30870	Connector—2 prong male plug for motor cable
70121	Motor—117 volt 60 cycle motor complete with mounting plate and turntable
39530	Plate—Idler wheel plate
39528	Spindle—Turntable spindle
39534	Spring—Idler wheel tension spring
72840	Turntable—Finished turntable only
39529	Wheel—Idler wheel
	SPEAKER ASSEMBLIES 922258-2
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70398	Clamp—Dial clamps (1 set)
72685	Decal—Control panel decal
72684	Decal—Trade mark decal
72683	Dial—Glass dial scale
72292	Knob—Control knob
72293	Mounting—One set of hardware to mount pick-up arm
30868	Plug—2 contact female plug for interlock switch (J2)
72600	Spring—Conversion spring (60 to 50 cycle operation)
14270	Spring—Retaining spring for knob
72745	Switch—Interlock switch, slide type D.P.D.T. (S4)
72546	Transformer—Step-down transformer, 210-25 volt 50/60 cycle primary, 117 volt 50/60 cycle secondary (T4)

APPLY TO YOUR DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Q103-2, Q103A-2
Q103X-2, Q103AX-2

Q103, Q103A
Q103X, Q103AX

RCA MODELS
Q103, Q103-2, Q103A, Q103A-2
Chassis No. RC-1044
Q103X, Q103X-2, Q103AX, Q103AX-2
Chassis No. RC-1044B

Mfr. No. 274

Service Data

1947....X1

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges Chassis No. RC-1044

Standard Broadcast ("A" Band)	540-1600 kc (555-187 m)
Medium Wave ("B" Band)	2.3-7.0 mc (130-42.2 m)
Short Wave ("C" Band)	7.0-22 mc (42.2-13.6 m)

Frequency Ranges Chassis No. RC-1044B

Long Wave ("X" Band)	140-375 kc (2,222-780 m)
Standard Broadcast ("A" Band)	540-1600 kc (555-187 m)
Short Wave ("C" Band)	5.8-18.2 mc (51.7-16.5 m)

Intermediate Frequency.......455 kc

RCA Tube Complement

(1) RCA-12SA7	1st Detector-Oscillator
(2) RCA-12SK7	I-F Amplifier
(3) RCA-12SQ7	2nd Detector, A.V.C., and A-F Amplifier
(4) RCA-50L6GT	Power Output
(5) RCA-35Z5GT	Rectifier

Power Supply Ratings (D-C or 50 to 60 cycles A-C)

Q103, Q103-2, Q103X, Q103X-2—105-125 volts	30 watts
Q103A, Q103A-2, Q103AX, Q103AX-2—210-250 volts	60 watts

Power Output Rating

Undistorted	.9 watts
Maximum	1.5 watts

Loudspeaker

Type	4 x 6 in. elliptical PM
Voice Coil Impedance	3.4 ohms at 400 cycles

Tuning Drive Ratio.......20 to 1

Dimensions (Inches)	Width	Height	Depth
Cabinet (Outside)	15	9¾	7
Chassis Base (Outside)	13	2⅛	4½
Chassis Overall	13	9¾	4½
Weight Net			9 lbs.
Weight Shipping			11 lbs.

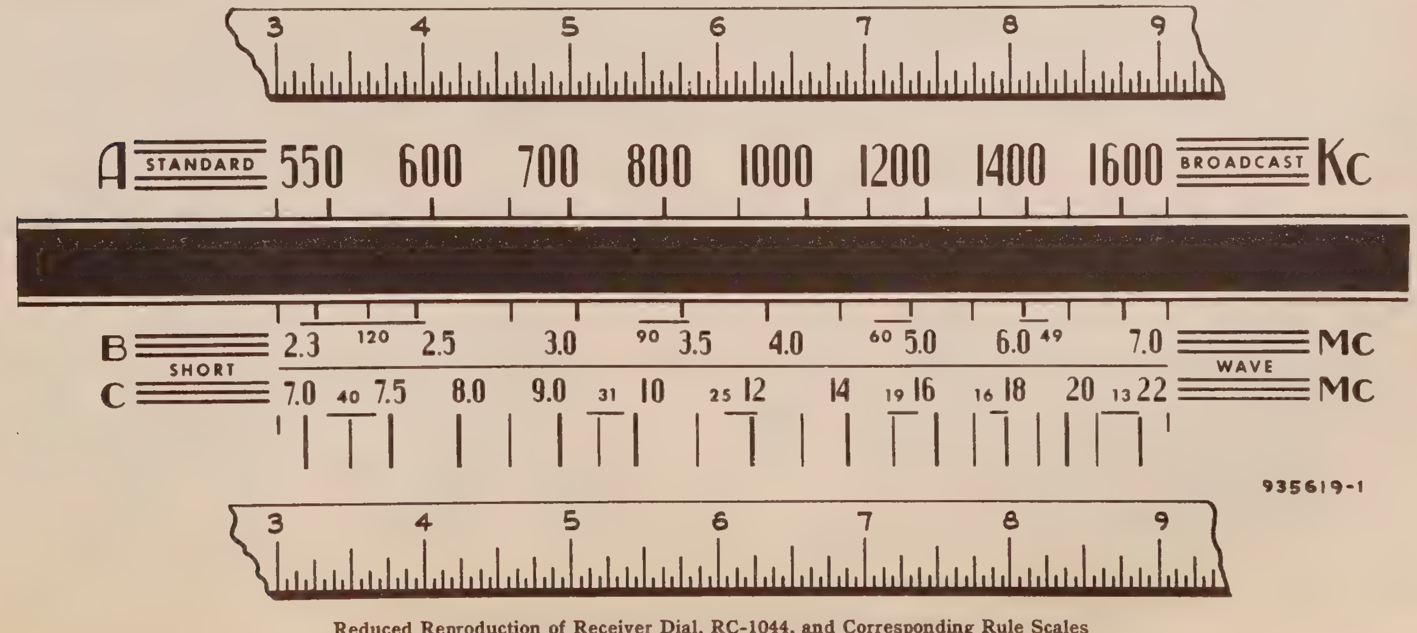
Phonograph Attachment.—A jack is provided on the bottom of the chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug. Plug must be removed when radio is in use.

When the phonograph is in use the volume control on the radio should be at minimum.

Plug-In Resistor.—Either a plug-in resistor or a shorting plug is used with these sets. The plugs are physically interchangeable and may be used to convert the set from 110 to 220 volts or from 220 to 110 volts. DANGER—Do not attempt to use these sets on 220 volts unless the plug-in RESISTOR is used. If the shorting plug is in place, serious damage will result. Consult the instrument label for original rating.

Disassembly.—Remove the screws holding the chassis bottom plate to the cabinet. Remove the chassis from the cabinet by removing the knobs and tilting the cabinet so that the chassis will slide back and out. Looking at the chassis from the front, a switch is visible on the left apron in the rear. This is an interlock switch. The set will not function out of the cabinet unless this switch is closed. A small screw through the interlock actuating arm and the hole in the chassis bottom plate will serve to keep the switch closed. When the chassis is replaced in the cabinet, remove the screw so that the switch will function.

Model	Bands	Power Supply	Cabinet
Q103	"A"-"B"-"C"	110V	Brown
Q103A	"A"-"B"-"C"	220V	Brown
Q103-2	"A"-"B"-"C"	110V	Ivory
Q103A-2	"A"-"B"-"C"	220V	Ivory
Q103X	"X"-"A"-"C"	110V	Brown
Q103AX	"X"-"A"-"C"	220V	Brown
Q103X-2	"X"-"A"-"C"	110V	Ivory
Q103AX-2	"X"-"A"-"C"	220V	Ivory



Reduced Reproduction of Receiver Dial, RC-1044, and Corresponding Rule Scales

The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of 4¹⁄₁₆" from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

***Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Alignment.—With the gang condenser in full mesh, the pointer should be set three inches from the left edge of the dial back plate. This point corresponds to the first mark on the dial scale to the left of "550" kc. on "A" band. To find any calibration point it is necessary to draw a line on the dial scale drawing through the desired freq., so that the line passes through the same reading on the top and bottom rule scales. For instance, 1300 kc. on "A" band will correspond to a dial indicator setting of 7¾" from the LEFT EDGE of the dial back plate. Move the indicator the desired distance by turning the tuning knob. ONCE THE INDICATOR HAS BEEN SET AT FULL MESH, MOVE THE INDICATOR ONLY BY TURNING THE TUNING KNOB.

Dial Indicator Adjustment.—After the set has been aligned, replace it in the cabinet. Turn the tuning knob until the condenser is in full mesh. The indicator should now be under the first mark on the dial scale face to the left of "550" kc on "A" band. If it is not, press out on the metal strip at the bottom of the dial glass. The metal strip will swing out exposing the dial indicator, which may be moved by sliding it along the dial string until it is at the desired point when the gang condenser is fully closed. If the indicator is more than a half inch off, the calibration should be rechecked.

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.
5. Maintain flexible loop in ground straps of tuning condenser. Allow slack in leads to tuning condenser stators.
6. All leads to 12SA7 socket must be dressed to insure flexibility of the socket.
7. Oscillator grid coupling capacitor C12 should be cemented to chassis with wax or glyptal cement.
8. Dress tracking capacitor C13 outside of the range switch assembly and cement it to the range switch spacer bar with wax or glyptal cement.

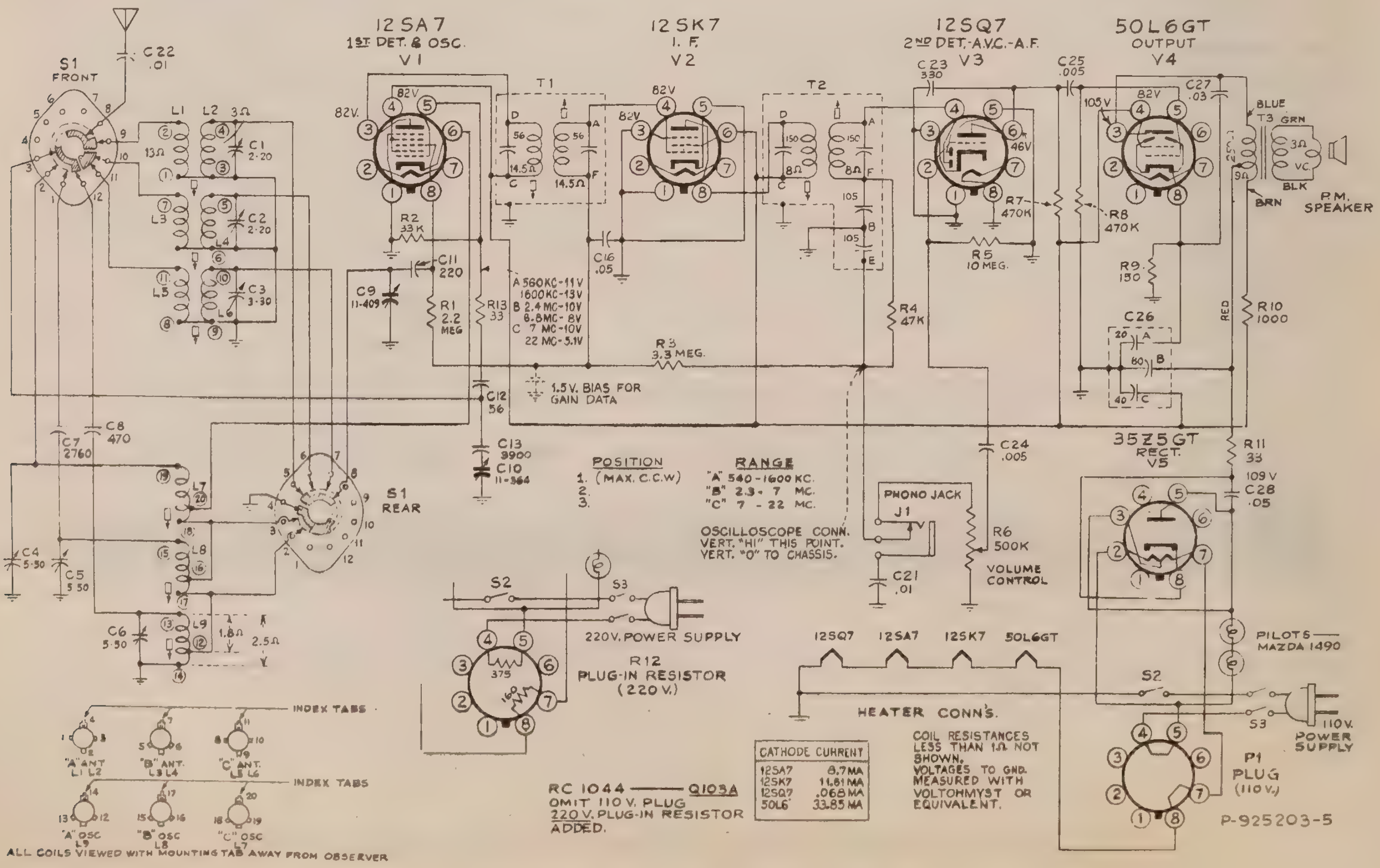
For additional information, refer to booklet "RCA Victor Receiver Alignment."

***Caution: This is an AC-DC type chassis with one side of the power line connected to the metal base, which is also—B. Connection from the signal generator must have a large (.1 MFD) capacitor in the ground side to prevent damage to the generator attenuator, unless the power source to the receiver is isolated from ground.**

Alignment Table, Q103, Q103-2, Q103A, Q103A-2

Steps	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Move indicator to—	Adjust following for max. output—
1	12SK7 I-F grid in series with .01 mfd. condenser	455 kc	A Band	Quiet point around 600 kc	T2 top and bottom core
2	12SA7 1st Det. grid in series with .01 mfd. condenser				T1 top and bottom core
3§	Antenna lead (blue) in series with a 300 ohm resistor	18.2 mc	C Band	18.2 mc	C4 osc.† C3 ant.‡
4		7.2 mc		7.2 mc	L7 osc.* L6 ant.
5		Repeat steps 3 and 4 until aligned			
6		6.1 mc	B Band	6.1 mc	C5 osc.† C2 ant.
7		2500 kc		2500 kc	L8 osc. L4 ant.
8	Repeat steps 6 and 7 until aligned				
9	Antenna lead (blue) in series with a 200 mmf condenser	1300 kc	A Band	1300 kc	C6 osc. C1 ant.
10		600 kc		600 kc	L9 osc. L2 ant.
11		Repeat steps 9 and 10 until aligned			

*Use min inductance if two peaks can be found.
†Use min. capacity if two peaks can be found.
‡Use max. capacity if two peaks can be found.
§Bottom shield cover in place after I-F's are aligned.


S1 FRONT
C22 .01
L1 L2 3Ω
13Ω
C1 2-20
L3 L4
C2 2-20
L5 L6
C3 3-30
C7 2760
C8 470
L7
L8
L9
C4 5-50
C5 5-50
C6 5-50
1.8Ω
2.5Ω
S1 REAR
12SA7
1ST DET. & OSC.
V1
82V.
82V
R2 33K
C11 220
C9 11-409
R1 2.2 MEG
R13 33
T1
56
14.5Ω
A 560KC-11V
1600KC-13V
B 2.4MC-10V
6.8MC-8V
C 7 MC-10V
22 MC-5.1V
C12 56
C13 3900
C10 11-364
1.5V. BIAS FOR GAIN DATA
12SK7
I. F.
V2
C16 .05
R3 3.3 MEG.
T2
150
8Ω
105
R4 47K
12SQ7
2ND DET.-A.V.C.-A.F.
V3
C23 330
46V
R7 470K
R8 470K
R5 10 MEG.
C24 .005
50L6GT
OUTPUT
V4
C25 .005
C27 .03
105V
BLUE
T3
GRN
3Ω
V.C.
BLK
BRN
9Ω
RED
P.M. SPEAKER
R9 150
R10 1000
C26
20 A
60 B
40 C
35Z5GT
RECT.
V5
R11 33
109 V
C28 .05
POSITION
1. (MAX. C.C.W)
2.
3.
RANGE
"A" 540-1600 KC.
"B" 2.3-7 MC.
"C" 7-22 MC.
OSCILLOSCOPE CONN.
VERT. "HI" THIS POINT.
VERT. "O" TO CHASSIS.
PHONO JACK
J1
C21 .01
R6 500K
VOLUME CONTROL
S2
S3
220V. POWER SUPPLY
R12
PLUG-IN RESISTOR
(220 V.)
375
160
12SQ7
12SA7
12SK7
50L6GT
HEATER CONN'S.
PILOTS—MAZDA 1490
110 V. POWER SUPPLY
P1 PLUG (110 V.)
CATHODE CURRENT
12SA7 8.7 MA
12SK7 11.81 MA
12SQ7 .068 MA
50L6 33.85 MA
COIL RESISTANCES LESS THAN 1Ω NOT SHOWN.
VOLTAGES TO GND. MEASURED WITH VOLTOHMYST OR EQUIVALENT.
RC 1044 — Q103A
OMIT 110 V. PLUG
220 V. PLUG-IN RESISTOR ADDED.
INDEX TABS
"A" ANT L1 L2
"B" ANT. L3 L4
"C" ANT. L5 L6
"A" OSC L9
"B" OSC L8
"C" OSC L7
ALL COILS VIEWED WITH MOUNTING TAB AWAY FROM OBSERVER
P-925203-5

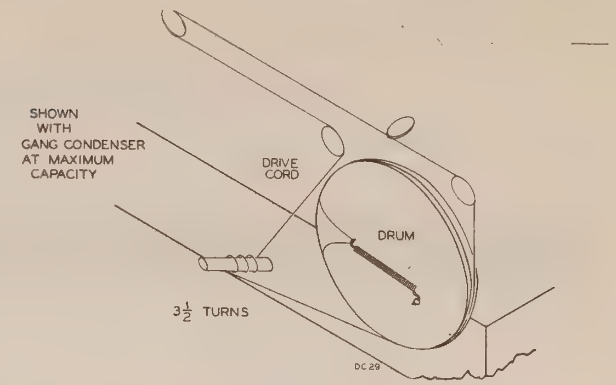
Schematic—Q103, Q103-2, Q103A, Q103A-2

Alignment Table Q103X, Q103X-2, Q103AX, Q103AX-2

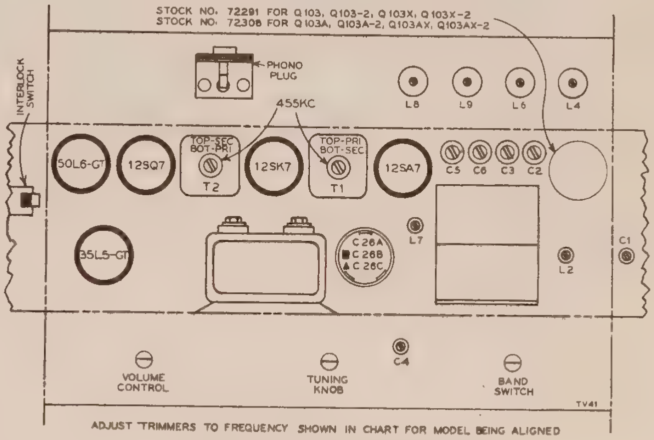
Steps	Connect high side of test-osc. to—	Tune test osc. to—	Range Switch	Move indicator to—	Adjust following for max. output—
1	12SK7 I-F grid in series with .01 mfd. condenser	455 kc	A Band	Quiet point around 600 kc	T2 top and bottom core
2	12SA7 1st Det. grid in series with .01 mfd. condenser				T1 top and bottom core
3§	Antenna lead (blue) in series with a 300 ohm resistor	15.2 mc	C Band	15.2 mc	C4 osc.† C3 ant.‡
4		6.1 mc		6.1 mc	L7 osc.* L6 ant.
5	Repeat steps 3 and 4 until aligned				
6	Antenna lead in series a 200 mmf. condenser	1300 kc	A Band	1300 kc	C5 osc. C2 ant.
7		600 kc		600 kc	L8 osc. L4 ant.
8		Repeat steps 6 and 7 until aligned			
9		350 kc	X Band	350 kc	C6 osc. C1 ant.
10		150 kc		150 kc	L9 osc. L2 ant.
11		Repeat steps 9 and 10 until aligned			

*Use min inductance if two peaks can be found.
†Use min. capacity if two peaks can be found.
‡Use max. capacity if two peaks can be found.
§Bottom shield cover in place after I-F's are aligned.

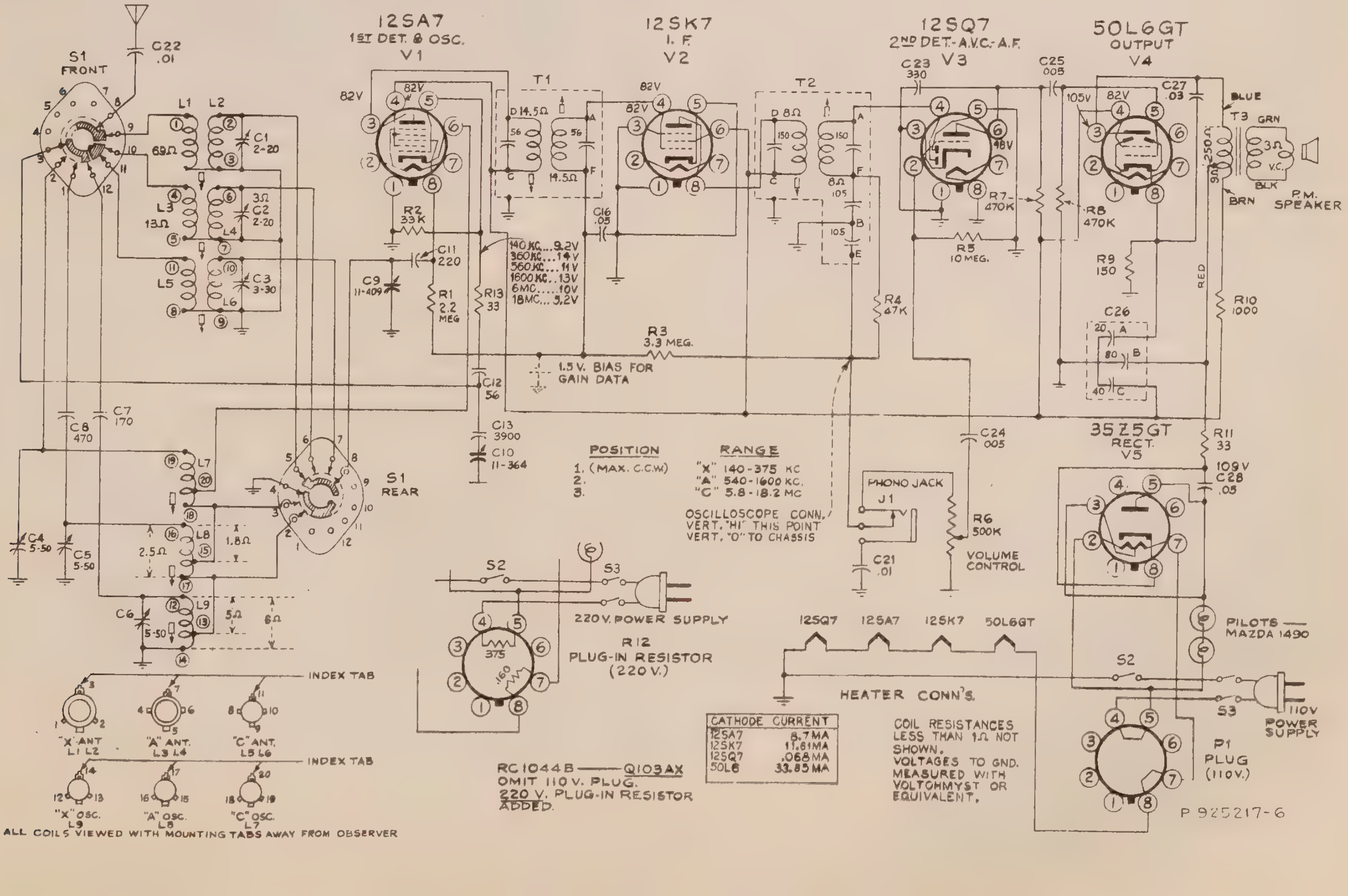
POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.


SHOWN WITH GANG CONDENSER AT MAXIMUM CAPACITY
DRIVE CORD
DRUM
3½ TURNS
DC 29

Dial-Indicator and Drive Mechanism


STOCK NO. 72291 FOR Q103, Q103-2, Q103X, Q103X-2
STOCK NO. 72308 FOR Q103A, Q103A-2, Q103AX, Q103AX-2
INTERLOCK SWITCH
PHONO PLUG
455KC
L8
L9
L6
L4
50L6-GT
12SQ7
TOP-SEC BOT-PRI
T2
12SK7
TOP-PRI BOT-SEC
T1
12SA7
C5
C6
C3
C2
35L5-GT
C26A
■C26B
▲C26C
L7
L2
C1
C4
VOLUME CONTROL
TUNING KNOB
BAND SWITCH
TV41
ADJUST TRIMMERS TO FREQUENCY SHOWN IN CHART FOR MODEL BEING ALIGNED

Tube and Trimmer Locations


12SA7
1ST DET. & OSC.
V1
12SK7
I. F.
V2
12SQ7
2ND DET.-A.V.C.-A.F.
V3
50L6GT
OUTPUT
V4
35Z5GT
RECT.
V5
S1 FRONT
C22 .01
L1
L2
69Ω
C1 2-20
L3 13Ω
3Ω
C2 2-20
L4
L5
C3 3-30
L6
82V
T1
D 14.5Ω
56
14.5Ω
R2 33K
C11 220
C9 11-409
R1 2.2 MEG
R13 33
140KC...9.2V
360KC...14V
560KC...11V
1600KC...13V
6MC...10V
18MC...5.2V
C16 .05
R3 3.3 MEG.
1.5V. BIAS FOR GAIN DATA
C12 56
C13 3900
C10 11-364
C8 470
C7 170
L7
S1 REAR
C4 5-50
C5 5-50
L8
2.5Ω
1.8Ω
C6 5-50
L9
5Ω
6Ω
T2
D 8Ω
150
8Ω
105
R4 47K
C23 330
48V
R7 470K
R5 10 MEG.
C25 .005
105V
C27 .03
R8 470K
R9 150
C26
20 A
80 B
40 C
BLUE
T3
GRN
250Ω
9Ω
3Ω
V.C.
BLK
BRN
P.M. SPEAKER
RED
R10 1000
R11 33
109V
C28 .05
C24 .005
POSITION
1. (MAX. C.C.W)
2.
3.
RANGE
"X" 140-375 KC
"A" 540-1600 KC.
"C" 5.8-18.2 MC
OSCILLOSCOPE CONN. VERT. "HI" THIS POINT VERT. "O" TO CHASSIS
PHONO JACK
J1
R6 500K
VOLUME CONTROL
C21 .01
S2
S3
220V. POWER SUPPLY
R12 PLUG-IN RESISTOR (220 V.)
375
160
12SQ7
12SA7
12SK7
50L6GT
HEATER CONN'S.
PILOTS — MAZDA 1490
110V POWER SUPPLY
P1 PLUG (110V.)
INDEX TAB
"X" ANT L1 L2
"A" ANT. L3 L4
"C" ANT. L5 L6
"X" OSC. L9
"A" OSC. L8
"C" OSC. L7
ALL COILS VIEWED WITH MOUNTING TABS AWAY FROM OBSERVER
RC1044B —— Q103AX OMIT 110 V. PLUG. 220 V. PLUG-IN RESISTOR ADDED.
CATHODE CURRENT
12SA7 8.7MA
12SK7 11.61MA
12SQ7 .068MA
50L6 33.85MA
COIL RESISTANCES LESS THAN 1Ω NOT SHOWN.
VOLTAGES TO GND. MEASURED WITH VOLTOHMYST OR EQUIVALENT.
P 925217-6

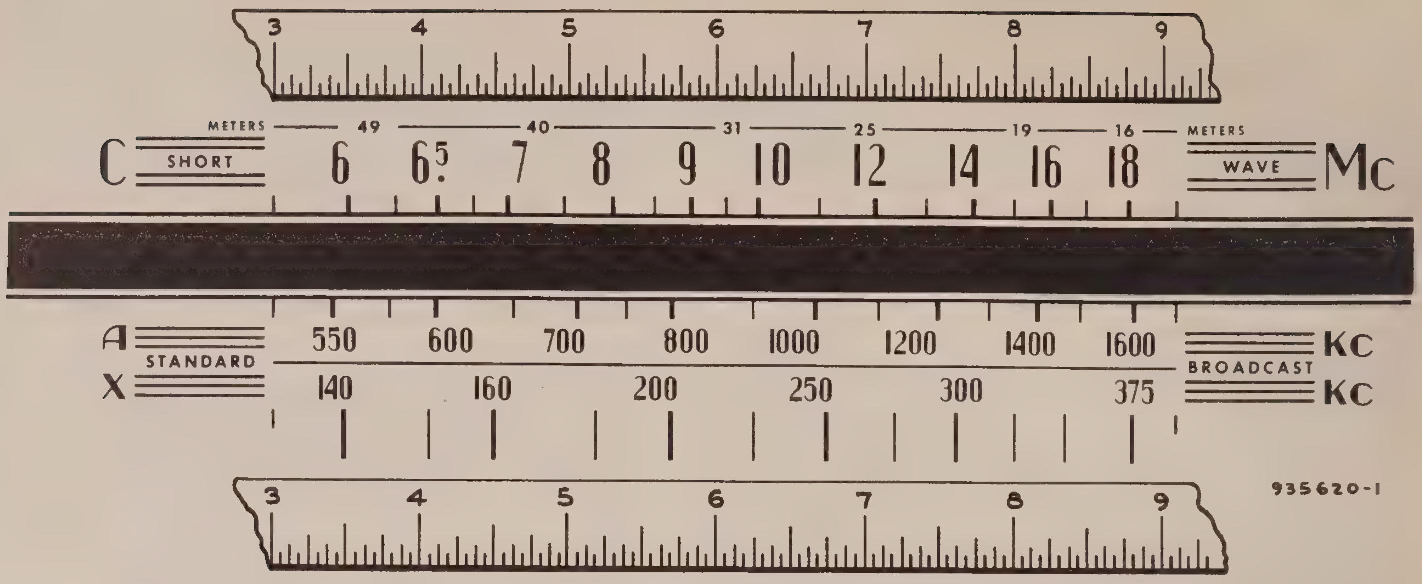
Schematic—Q103X, Q103X-2, Q103AX, Q103AX-2

Change in Parts List:

CHASSIS ASSEMBLIES

Add:

30789 Resistor—33 ohms, ½ watt (R13).



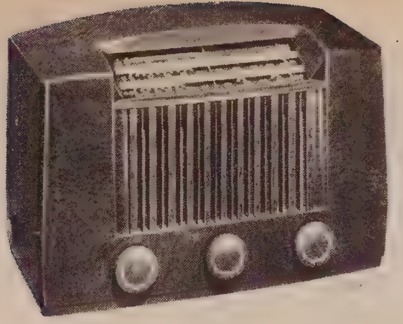
Reduced Reproduction of Receiver Dial, RC-1044B, and Corresponding Rule Scales

The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of 4 1/16" from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

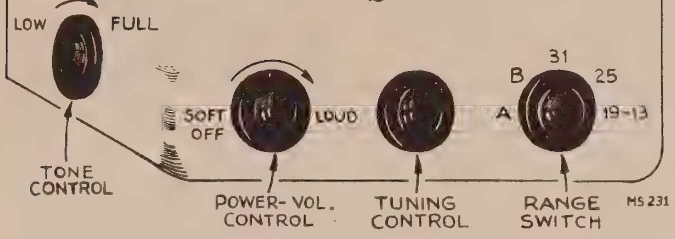
Replacement Parts

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1044—Q103, Q103-2, Q103A, Q103A-2 RC-1044B—Q103AX, Q103AX-2, Q103X, Q103X-2
72306	Capacitor—Mica trimmer, 3-30 mmf. (C3)
72307	Capacitor—Mica trimmer, 5-50 mmf. (C4)
39622	Capacitor—Mica, 56 mmf. (C12)
72794	Capacitor—Ceramic, 170 mmf. (C7 for Q103AX, Q103AX-2, Q103X, Q103X-2)
39636	Capacitor—Mica, 220 mmf. (C11)
72571	Capacitor—Mica, 330 mmf. (C23)
72814	Capacitor—Ceramic, 470 mmf. (C8)
72305	Capacitor—Mica trimmer, comprising 2 sections of 2-20 mmf. and 2 sections of 5-50 mmf. (C1, C2, C5, C6)
72795	Capacitor—Mica, 2760 mmf. (C7 for Q103, Q103-2, Q103A, Q103A-2)
72637	Capacitor—Mica, 3900 mmf. (C13)
71699	Capacitor—Molded paper, .005 mfd., 400 volts (C24, C25)
71770	Capacitor—Molded paper, .01 mfd., 400 volts (C21, C22)
72815	Capacitor—Molded paper, .03 mfd., 400 volts (C27)
71702	Capacitor—Molded paper, .05 mfd., 400 volts (C16, C28)
72281	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C26)
72576	Coil—Antenna coil, "A" band (L1, L2 for Q103 and Q103A, Q103-2, Q103A-2; L3, L4 for Q103AX, Q103X, Q103X-2, Q103AX-2)
72298	Coil—Antenna coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L3, L4)
72299	Coil—Antenna coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L5, L6)
72276	Coil—Antenna coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L5, L6)
72297	Coil—Antenna coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2, (L1, L2)
72575	Coil—Oscillator coil, "A" band (L9 for Q103, Q103A, Q103-2, Q103A-2, L8 for Q103AX, Q103X, Q103X-2, Q103AX-2)
72302	Coil—Oscillator coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L8)
72303	Coil—Oscillator coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L7)
72274	Coil—Oscillator coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L7)
72300	Coil—Oscillator coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L9)
72294	Condenser—Variable tuning condenser (C9, C10)
38410	Control—Volume control and power switch (R6, S2)
34662	Cord—Drive cord (approx. 56" overall length)
70384	Drum—Drive drum
72283	Grommet—Rubber grommet for mounting tuning condenser and speaker
70429	Grommet—Rubber grommet for mounting tube socket
72547	Indicator—Station selector indicator
71116	Lamp—Dial lamp, Mazda No. 1490
72548	Plate—Dial back plate complete with drive cord pulleys
36230	Pulley—Drive cord pulley
71290	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ½ watt (R9)
71916	Resistor—1000 ohms, 1 watt (R10)
30685	Resistor—33,000 ohms, ½ watt (R2)
30787	Resistor—47,000 ohms, ½ watt (R4)
30648	Resistor—470,000 ohms, ½ watt (R7, R8)
30649	Resistor—2.2 megohms, ½ watt (R1)
31417	Resistor—3.3 megohms, ½ watt (R3)
30992	Resistor—10 megohms, ½ watt (R5)
72577	Shaft—Tuning knob shaft
71115	Socket—Lamp socket
72295	Socket—Phono-input socket (J1)
37605	Socket—Tube socket
31319	Socket—Tube socket
70390	Spring—Drive cord spring
72745	Switch—Interlock switch, slide type, D.P.D.T. (S3)
72304	Switch—Range switch (S1)
72545	Transformer—First I. F. transformer (T1)
70918	Transformer—Second I. F. transformer (T2)
72296	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 922258-2
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil. NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71122	Baffle—Speaker baffle
71123	Bottom—Case bottom
Y1354	Cabinet—Brown plastic cabinet for Q103, Q103A, Q103X, Q103AX
Y1355	Cabinet—Ivory plastic cabinet for Q103-2, Q103A-2, Q103X-2, Q103AX-2
72578	Clamp—Dial clamp (2 required)
72686	Decal—Power switch decal
72687	Decal—Range switch decal for Q103AX, Q103AX-2, Q103X, Q103X-2
72747	Decal—Range switch decal for Q103, Q103-2, Q103A and Q103A-2
72609	Dial—Glass dial scale for Q103, Q103A, Q103-2, Q103A-2
72610	Dial—Glass dial scale for Q103AX, Q103X, Q103X-2, Q103AX-2
71127	Foot—Cabinet foot (walnut) for Q103, Q103A, Q103AX, Q103X (4 required)
71128	Foot—Cabinet foot (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 (4 required)
70473	Knob—Tuning knob (walnut) for Q103, Q103A, Q103AX, Q103X
70474	Knob—Tuning knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
72549	Knob—Volume control or range switch knob (walnut) for Q103, Q103A, Q103AX, Q103X
72550	Knob—Volume control or range switch knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2
71126	Nut—Speed nut to fasten hand grip screen (4 required)
72291	Plug—Shorting plug for Q103, Q103-2, Q103X, Q103X-2
72308	Resistor—Plug-in resistor for Q103A, Q103A-2, Q103AX and Q103AX-2 (R12)
71125	Screen—Protective screen for hand grip
72746	Slide—Interlock switch actuating slide
30900	Spring—Retaining spring for knobs
71130	Spring—Retaining spring for front strip
71129	Strip—Finished strip for cabinet front
34373	Washer—"C" washer to hold interlock actuating

APPLY TO YOUR DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model Q121


LOW
FULL
TONE CONTROL
SOFT
OFF
LOUD
B
31
25
A
19-13
POWER-VOL. CONTROL
TUNING CONTROL
RANGE SWITCH
MS 231

Location of Controls

RCA MODEL Q121

Chassis No. RC-507 and RC-507U
Mfr. No. 274

Service Data

1946 • • • • X7

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N.Y.

Electrical and Mechanical Specifications

Chassis No. RC-507U differs from Chassis No. RC-507 in that it is equipped with a permanent magnet dynamic loudspeaker. Other than the loudspeaker and required changes to the power supply filter, and output tubes bias circuits, the chassis are identical.

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SA7	1st Detector-Oscillator
(2) RCA-6SK7	I-F Amplifier
(3) RCA-6SQ7	2nd Detector, A-F Amplifier, A.V.C.
(4) RCA-6AD7-G	Phase Inverter, Power Output
(5) RCA-6F6-G	Power Output
(6) RCA-5Y3-GT	Rectifier

Power Output Rating

Undistorted	3 watts
Maximum	3.5 watts

Loudspeaker

Chassis No. RC-507	Identification No. 92517-1
Type (Electrodynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms
Chassis No. RC-507U	Identification No. 92570-1
Type (P.M. dynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms

Cabinet Dimensions (Inches)

	Height	Width	Depth
Q121 (Plastic)	10⅞	16¼	7⅝

Net Weight (pounds)	21
Shipping Weight (pounds)	25
Chassis Base Dimensions (inches)	Height, 2¾; Width, 15⅛; Depth, 5¼
Over-all Chassis Height	9¼ inches
Tuning Drive Ratio	25 to 1

Power Supply Ratings

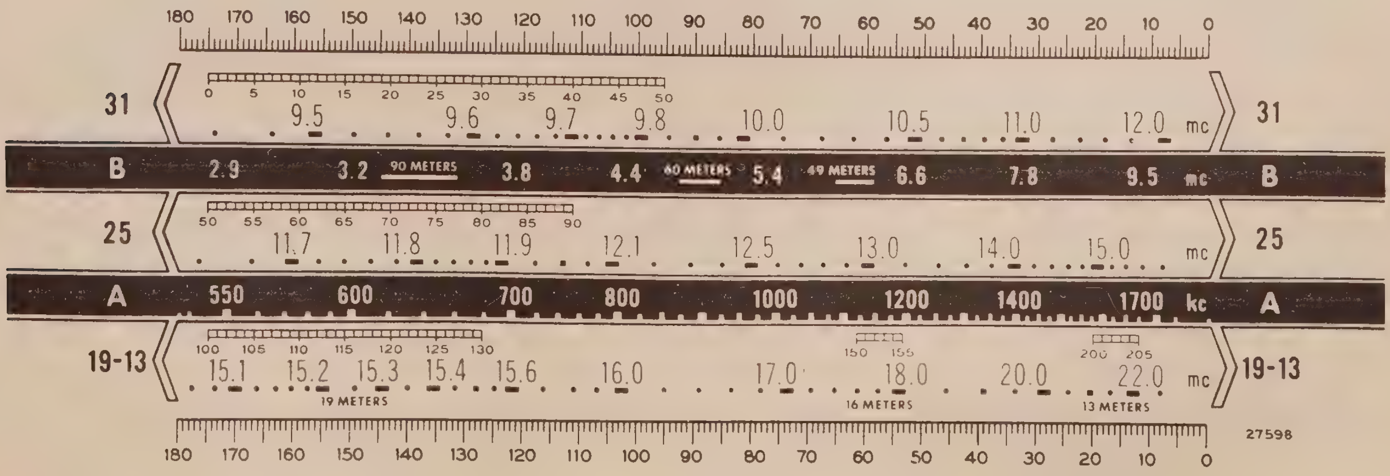
Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105 to 125 volts, 117 nominal	50-60	65
Rating B	105 to 125 volts, 117 nominal	25-60	65
Rating C	105 to 125 volts, 117 nominal 210 to 250 volts, 234 nominal	50-60	65

(Shipped in 210-250 volt position)

Phonograph Attachment.—A jack is provided on the rear of chassis for connection to a Phonograph Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Phonograph is not in use its plug should be removed. When Phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

Calibration Scale


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
31
0 5 10 15 20 25 30 35 40 45 50
9.5 9.6 9.7 9.8 10.0 10.5 11.0 12.0 mc
B
2.9 3.2 90 METERS 3.8 4.4 60 METERS 5.4 49 METERS 6.6 7.8 9.5 mc
25
50 55 60 65 70 75 80 85 90
11.7 11.8 11.9 12.1 12.5 13.0 14.0 15.0 mc
A
550 600 700 800 1000 1200 1400 1700 kc
19-13
100 105 110 115 120 125 130
150 155
200 205
15.1 15.2 15.3 15.4 15.6 16.0 17.0 18.0 20.0 22.0 mc
19 METERS
16 METERS
13 METERS
27598

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

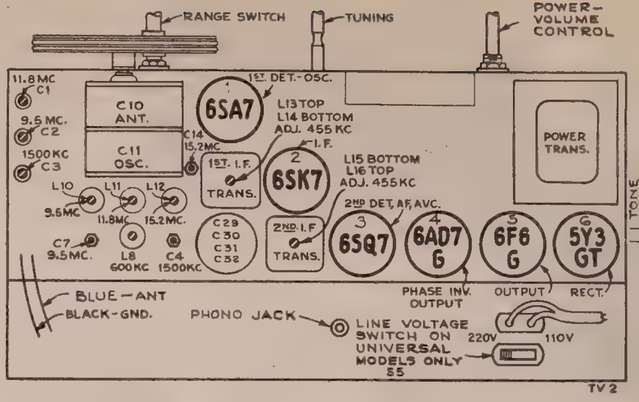
Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillaor, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."


RANGE SWITCH
TUNING
POWER-VOLUME CONTROL
11.8 MC C1
9.5 MC. C2
1500 KC C3
C10 ANT.
C11 OSC.
C14 15.2 MC
1ST. DET.-OSC.
6SA7
L13 TOP
L14 BOTTOM
ADJ. 455 KC
I.F.
1ST. I.F. TRANS.
2
6SK7
L15 BOTTOM
L16 TOP
ADJ. 455 KC
POWER TRANS.
TONE CONTROL
L10 9.5MC
L11 11.8MC
L12 15.2MC.
C7 9.5MC.
L8 600KC
C4 1500KC
C29 C30 C31 C32
2ND. I.F TRANS.
2ND DET, AF, AVC.
3 6SQ7
4 6AD7 G
5 6F6 G
6 5Y3 GT
PHASE INV. OUTPUT
OUTPUT
RECT.
BLUE—ANT
BLACK-GND.
PHONO JACK
LINE VOLTAGE SWITCH ON UNIVERSAL MODELS ONLY
S5
220V
110V
TV 2

Tube and Trimmer Locations

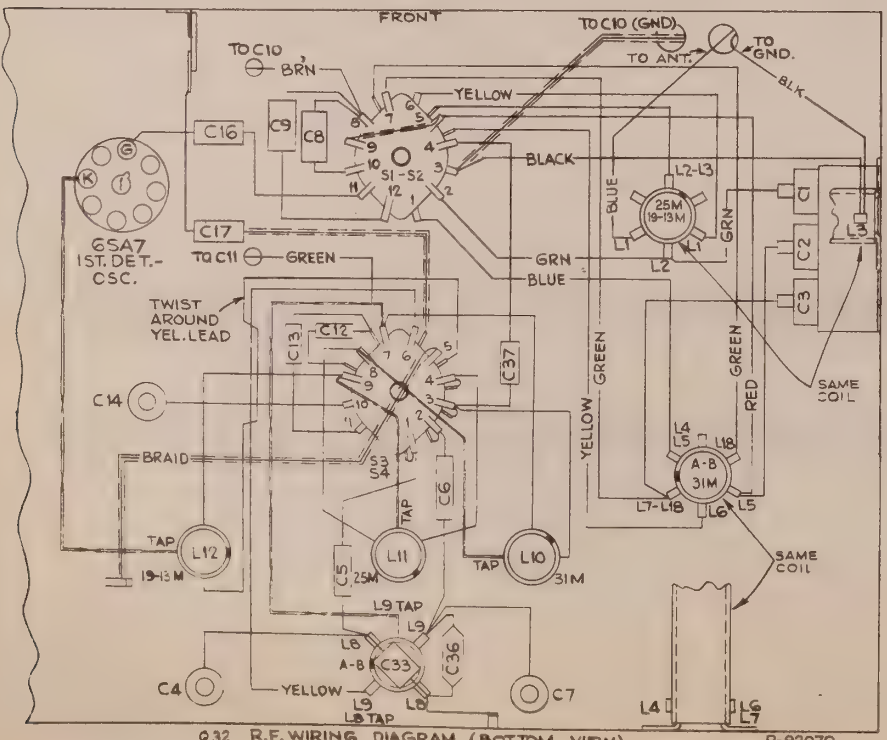
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L15 and L16 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25 M	138.5°	L11 (osc.)** C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13 M	156°	L12 (osc.)**
7		9.5 mc	31 M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

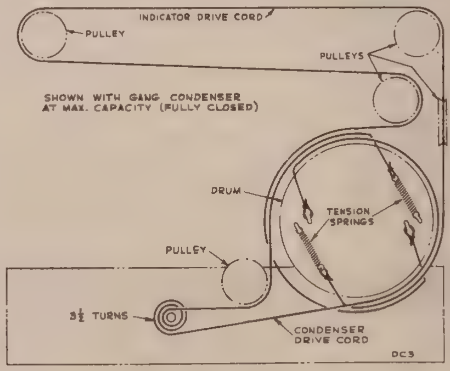
** If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

*** Peak at minimum capacity if two peaks can be obtained.

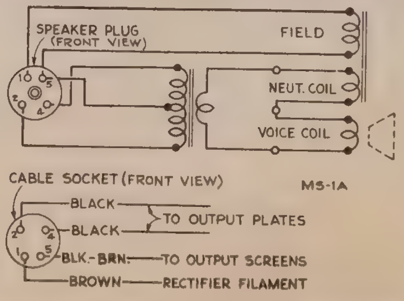
NOTE: Oscillator tracks above signal on all bands.


FRONT
TO C10 (GND)
TO ANT.
TO GND.
BLK.
TO C10
BRN
YELLOW
BLACK
C16
C9
C8
S1-S2
L2-L3
25M 19-13M
BLUE
GRN
L1
L2
L3
C1
C2
C3
6SA7 1ST. DET.-OSC.
G
K
C17
TO C11
GREEN
GRN
BLUE
TWIST AROUND YEL. LEAD
C13
C12
C37
C14
GREEN
YELLOW
GREEN
RED
SAME COIL
BRAID
S3 S4
C6
TAP
L4 L5 L18
A-B 31M
L7-L18
L6
L5
TAP
L12
19-13 M
L11
C5
25M
TAP
L10
31M
SAME COIL
L9 TAP
L9
L8
A-B
C33
C36
C4
YELLOW
L9
L8
L8 TAP
C7
L4
L6 L7
P-92070

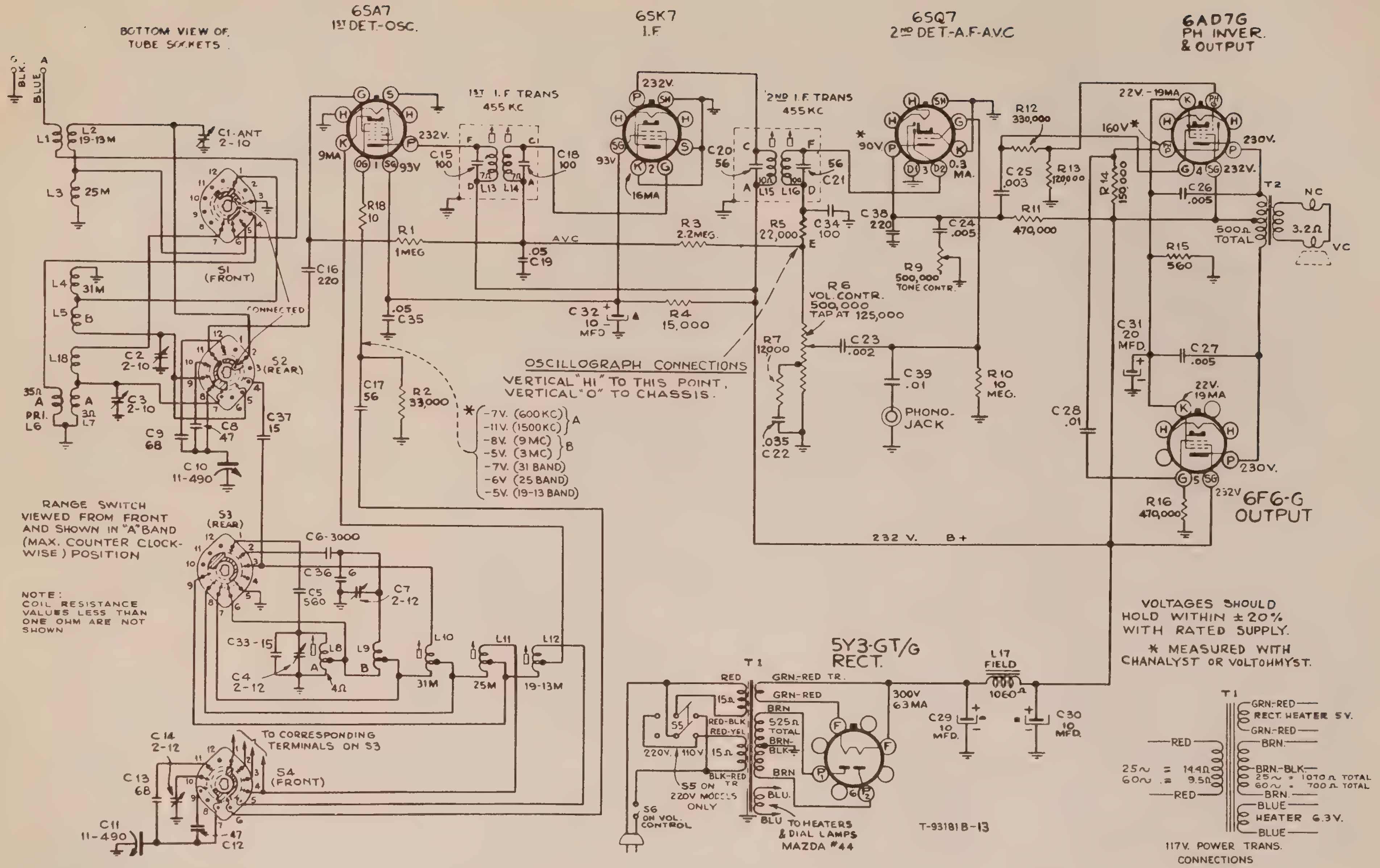
Q32 R.F. WIRING DIAGRAM (BOTTOM VIEW)


INDICATOR DRIVE CORD
PULLEY
PULLEYS
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY (FULLY CLOSED)
DRUM
TENSION SPRINGS
PULLEY
3½ TURNS
CONDENSER DRIVE CORD
DC3

Dial-Indicator and Drive Mechanism


SPEAKER PLUG (FRONT VIEW)
FIELD
NEUT. COIL
VOICE COIL
CABLE SOCKET (FRONT VIEW)
MS-1A
BLACK
BLACK
TO OUTPUT PLATES
BLK.-BRN.
TO OUTPUT SCREENS
BROWN
RECTIFIER FILAMENT

Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507


BOTTOM VIEW OF TUBE SOCKETS
6SA7
1ST DET.-OSC.
6SK7
I.F
6SQ7
2ND DET.-A.F.-A.V.C
6AD7G
PH INVER.
& OUTPUT
6F6-G
OUTPUT
5Y3-GT/G
RECT.
1ST I.F TRANS
455 KC
2ND I.F TRANS
455 KC
BLX.
BLUE
L1
L2 19-13M
L3 25M
L4 31M
L5 B
L18
PRI. L6
35Ω A
3Ω L7
C1-ANT 2-10
C2 2-10
C3 2-10
C9 68
C8 47
C10 11-490
C37 15
C16 220
S1 (FRONT)
S2 (REAR)
CONNECTED
R18 10
R1 1MEG
AVC
C15 100
C18 100
C19 .05
C35 .05
C17 56
R2 33,000
232V.
93V
9MA
16MA
R3 2.2MEG.
R4 15,000
C32 10 MFD
C20 56
C21 56
L13
L14
L15
L16
C34 100
C38 220
R5 22,000
E
R6 VOL. CONTR. 500,000 TAP AT 125,000
R7 12000
C22 .035
C23 .002
C39 .01
PHONO-JACK
R9 500,000 TONE CONTR.
C24 .005
R10 10 MEG.
90V
0.3 MA.
R12 330,000
R13 120,000
C25 .003
R11 470,000
R14 150,000
C26 .005
22V.-19MA
160V
230V.
232V.
T2
500Ω TOTAL
3.2Ω
NC
VC
R15 560
C31 20 MFD.
C27 .005
C28 .01
22V. 19MA
R16 470,000
232V
232 V. B+
S3 (REAR)
C6-3000
C36 6
C5 560
C7 2-12
C33-15
C4 2-12
L8
L9
L10
L11
L12
4Ω
31M
25M
19-13M
A
B
C14 2-12
C13 68
C11 11-490
C12 -47
S4 (FRONT)
TO CORRESPONDING TERMINALS ON S3
T1
RED
GRN-RED TR.
GRN-RED
BRN
BRN
BLK
15Ω
525Ω TOTAL
RED-BLK
RED-YEL
15Ω
BLK-RED
BLU.
S5
220V.
110V
S5 ON 220V MODELS ONLY
S6 ON VOL. CONTROL
TO HEATERS & DIAL LAMPS MAZDA #44
300V 63MA
L17 FIELD 1060Ω
C29 10 MFD.
C30 10 MFD.
T-93181B-13
GRN-RED
RECT. HEATER 5V.
BRN.
BRN.-BLK.
25~ = 1070Ω TOTAL
60~ = 700Ω TOTAL
25~ = 14.4Ω
60~ = 9.5Ω
BLUE
HEATER 6.3V.
117V. POWER TRANS. CONNECTIONS

OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS POINT.
VERTICAL "O" TO CHASSIS.

* -7V. (600KC) } A
-11V. (1500KC) } A
-8V. (9MC) } B
-5V. (3MC) } B
-7V. (31 BAND)
-6V (25 BAND)
-5V. (19-13 BAND)

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCK-WISE) POSITION

NOTE: COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN

VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

Precautionary Lead Dress

All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.

All oscillator coil leads must be kept apart from each other and other leads and parts.

Blue plate lead of 2nd I-F transformer must be dressed down close to chassis and made as short as possible.

Power transformer leads to the 110-220 volt switch must be dressed away from the audio circuits.

A-C leads to the power switch must be twisted and dressed up towards the end of chassis apron and kept away from the volume control circuits.

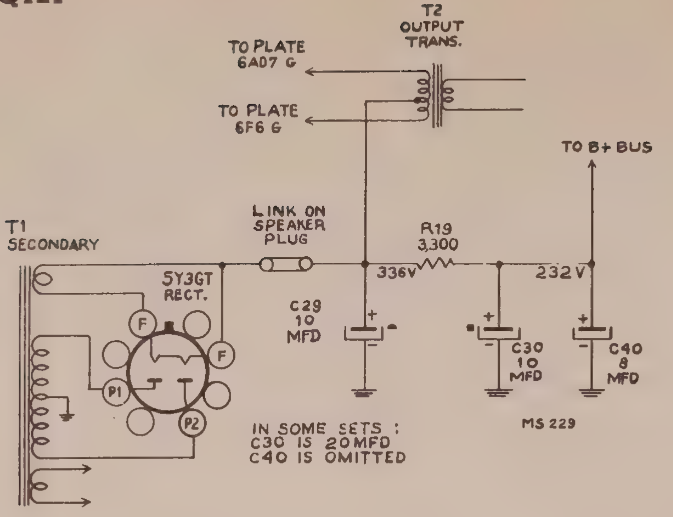
Schematic Circuit Diagram

Chassis No. RC-507

(See separate diagram for Chassis No. RC-507U

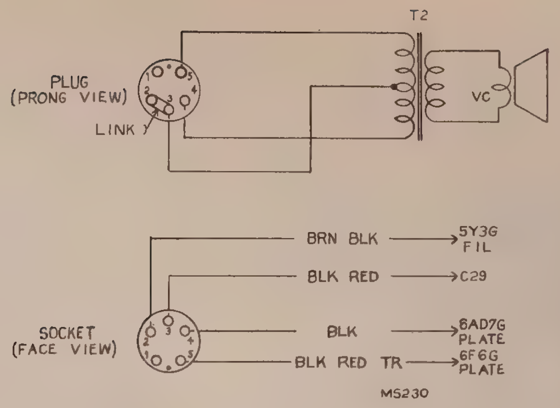
NOTE: In some sets and on some replacement units, the power transformer color code may vary from that shown above. On universal transformers (Rating C), the primary No. 1 start may be black; primary No. 1 finish black/yellow; primary No. 2 start black/green; primary No. 2 finish black/red. On the 25 and 60 cycle transformers (Ratings A and B) the primary start and finish may be black. Secondaries of the three transformers would be: rectifier filament, yellow; high-voltage, red; high-voltage center tap, red/yellow; amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

Q121



Chassis No. RC-507U Power Supply Circuit Diagram

Output tubes cathode bias resistor is 820 ohms (R15)—otherwise identical to chassis No. RC-507 except as shown above.

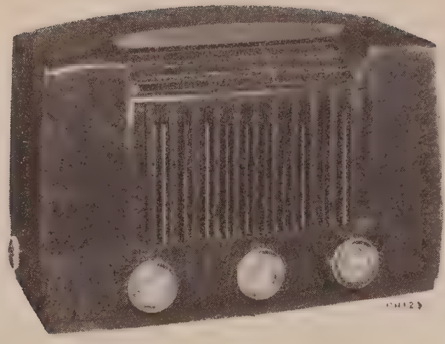


Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507U

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-507 AND RC-507U
35622	Bracket—Flywheel and tuning shaft mounting support
37976	Bracket—Support bracket for tone control
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14)
34654	Capacitor—Mica trimmer, comprising three sections of 2.5-10 mmf. (C1, C2, C3)
35646	Capacitor—Ceramic, 6 mmf. (C36)
36012	Capacitor—Ceramic, 15 mmf. (C37)
39041	Capacitor—Ceramic, 18 mmf. (C33)
70582	Capacitor—Ceramic, 47 mmf. (C8, C12)
39622	Capacitor—Mica, 56 mmf. (C17)
35645	Capacitor—Ceramic, 68 mmf. (C-13)
70586	Capacitor—Mica, 68 mmf. (C9)
39628	Capacitor—Mica, 100 mmf. (C15, C18, C34)
39636	Capacitor—Mica, 220 mmf. (C16, C38)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70585	Capacitor—Tubular, .0015 mfd., 1500 volts (C23)
70644	Capacitor—Tubular, .0025 mfd., 700 volts (C25)
70627	Capacitor—Tubular, .005 mfd., 500 volts (C24)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C27, C26)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C28, C39)
70614	Capacitor—Tubular, .035 mfd., 400 volts (C22)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C19, C35)
33014	Capacitor—Electrolytic, comprising 3 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C29, C30, C31, C32) (RC-507 only)
33195	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts, 2 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C29, C30, C31, C32) for RC-507U only.
35632	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7, L18)
35631	Coil—Antenna coil, spread band (L1, L2, L3)
35623	Coil—Oscillator coil, "A" and "B" band (L8, L9)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
35619	Condenser—Variable tuning condenser (C10, C11)
35629	Control—Tone control (R9)
35620	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 28" overall length)
34662	Cord—Indicator cord (approx. 53" overall length)
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter band, 25 meter band and 31 meter band oscillator coils
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning shaft flywheel
70930	Grommet—Rubber grommet for mounting tuning condenser (4 required)
5040	Plug—4 contact female plug for speaker cable (RC-507 only)
12493	Plug—5 contact female plug for speaker cable (RC-507U only)
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley
34761	Resistor—10 ohms, ¼ watt (R18)
30735	Resistor—560 ohms, 1 watt (RC-507 only) (R15)
39050	Resistor—820 ohms, 1 watt (RC-507U only) (R15)
48674	Resistor—3,300 ohms, 4 watt (RC-507U only) (R19)
30436	Resistor—12,000 ohms, ¼ watt (R7)
35595	Resistor—15,000 ohms, 3 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ¼ watt (R13)
30493	Resistor—150,000 ohms, ½ watt (R14)
14983	Resistor—330,000 ohms, ¼ watt (R12)
30648	Resistor—470,000 ohms, ½ watt (R11, R16)
30652	Resistor—1 megohm ¼ watt (R1)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R10)
14350	Screw—#8-32 square head set screw for drive drum
35633	Shaft—Extension shaft for range switch
35637	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
14278	Socket—Phono input socket
31251	Socket—Tube socket
31261	Spring—Retaining spring for oscillator coils core and studs
31418	Spring—Tension spring for drive or indicator cord
35640	Support—Drive cord pulley support complete with one pulley
35639	Support—Drive cord pulley support complete with three pulleys
35621	Switch—Range switch (S1, S2, S3, S4)
32827	Switch—Voltage change switch (S5)
35636	Transformer—First I-F transformer (L13, L14, C15, C18)
35628	Transformer—Second I-F transformer (L15, L16, C20, C21)
32852	Transformer—Power transformer, 117 or 235 volt, 50 to 60 cycle (Rating "C") (T1)
35588	Tansformer—Power transformer, 117 volt, 25 to 60 cycle (T1)
2917	Washer—"C" washer to fasten tuning shaft
33726	Washer—"C" washer to fasten idler pulley
	SPEAKER ASSEMBLY Stamped 92517-1J (For RC-507 only)
70578	Cone—Cone and voice coil assembly
5118	Plug—4 prong male speaker plug
70583	Speaker—6½" E.M. speaker complete with cone and voice coil, less output transformer and plug
70584	Transformer—Output transformer (T2)
	SPEAKER ASSEMBLY Stamped 92570-1J (For RC-507U only)
72425	Speaker—6½" P. M. speaker complete with cone and voice coil, less output transformer and plug
72520	Cone—Cone and voice coil assembly
72426	Transformer—Output transformer (T2)
31539	Plug—5 prong speaker plug
	SPEAKER ASSEMBLIES 92570-1M (For RC-507U only)
73040	Cone—Cone and voice coil assembly
31539	Plug—5 prong speaker plug
72426	Transformer—Output transformer (T2)
	NOTE: When replacing complete speaker 92570-1M use speaker stamped 92570-1J (Stock No. 72425).
	MISCELLANEOUS
*72143	Back—Cabinet back
70833	Board—Baffle board and grille cloth
Y1382	Cabinet—Plastic cabinet
70579	Decal—Trade mark decal
35654	Dial—Glass dial scale
35647	Frame—Dial frame only less indicator and dial
70580	Indicator—Station selector indicator
35651	Knob—Range switch knob
35652	Knob—Range indicator knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob
11891	Lamp—Dial lamp, Mazda 44
14270	Spring—Retaining spring for knobs #34489, 35650 or 35651
4982	Spring—Retaining spring for knob #35652

APPLY TO YOUR DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Q122, Q122X

RCA MODELS Q122, Q122X

Chassis No. RC601, RC601A, RC601D, RC601E
Mfr. No. 274

Service Data

1946.....X 8

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges, Q-122, Q-122a

Standard Broadcast ("A" Band)	540—1600 kc.	(556—187 m)
Medium Wave ("B" Band)	2.45—6.3 mc.	(122—47.7 m)
"31-25 Meter" Spread Band	9.5 — 12 mc.	(31.6—25 m)
"19-16 Meter" Spread Band	15.1 — 18 mc.	(19.8—16.6 m)
"13-11 Meter" Spread Band	21.4 — 27 mc.	(14 —11.1 m)

Models Q-122X, Q-122Xa, will have in place of the "B" Band, and the "13-11 Meter" Band:

Long Wave ("X" Band)	140—375 kc.	(2,140—800 m)
"49-40 Meter" Spread Band	6.—7.3 mc.	(50—41 m)

Intermediate Frequency .... **455 kc.**

Tube Complement

(1) RCA 6SA7	1st Detector
(2) RCA 6SG7	I-F Amplifier
(3) RCA 6SQ7	2nd Detector, A.V.C., A-F Amplifier
(4) RCA 6AT6	Phase Inverter
(5) RCA 6F6G	Power Output
(6) RCA 6F6G	Power Output
(7) RCA 5Y3 GT	Rectifier

Power Output Rating	Undistorted	Maximum
Q122, Q122X	4.2 watts	5.0 watts
Q122a, Q122Xa	5.2 watts	5.4 watts

Loudspeaker

Chassis No. RC 601, RC 601A	92517-1
Type (Electrodynamic)	6½"
V-C Impedance (400 c.p.s.)	3.4 ohms
Chassis No. RC 601D, RC 601E	92570-1
Type (PM)	6½"
V-C Impedance (400 c.p.s)	3.4 ohms

Pilot Lamps .... 2 type 44 6.3 volts, 0.25 amp

Cabinet Dimensions

Height	10½"
Width	16½"
Depth	6½"
Net Weight	approx. 19 lbs.
Shipping Weight	approx. 25 lbs.

Chassis Base Dimensions (inches) Height, 3; Length, 14; Depth, 6

Over-all Chassis Height	9½"
Tuning Drive Ratio	25:1

Power Supply Ratings

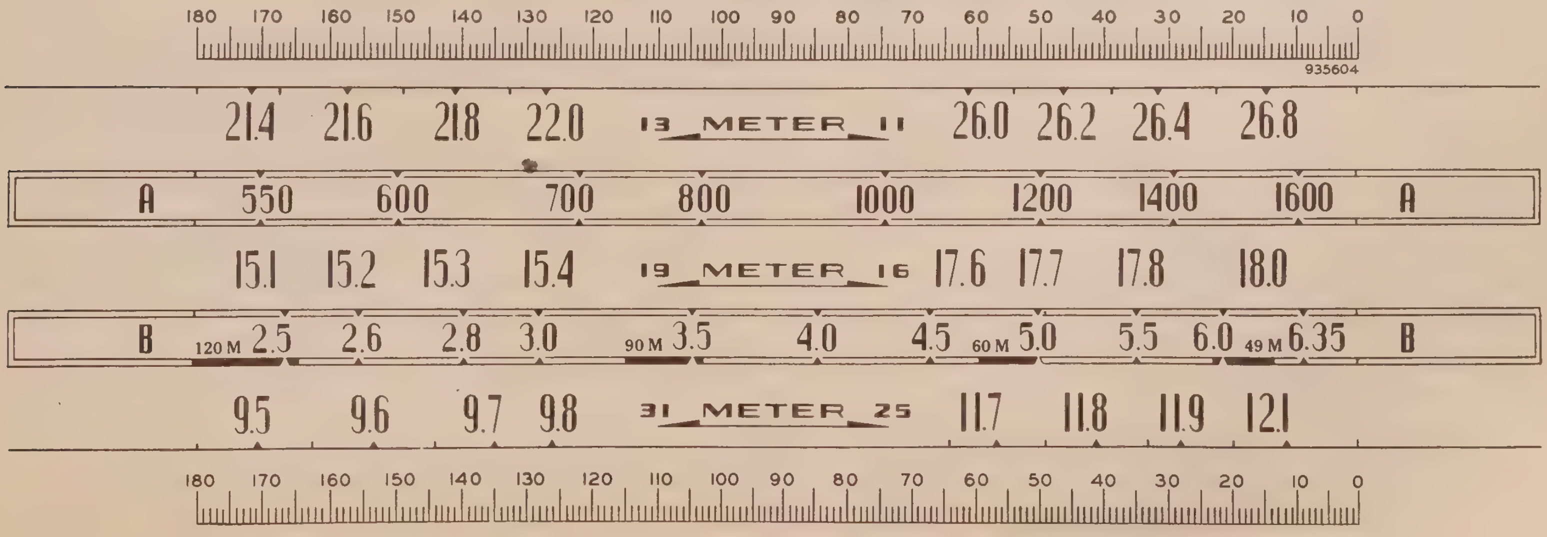
Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	65
Rating B	105-125	25-60	65
Rating C	105-125, 200-250	50-60	65

(Shipped in 225-250 volt position)

Phonograph Attachment.—A jack is provided on the rear of chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

Chassis No. RC 601 and chassis RC 601A differ from RC 601E and RC 601D in that they are equipped with an electrodynamic speaker. Other than the frequency ranges covered, trimmer locations, and power supply filtering, the chassis are identical.


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
935604
21.4 21.6 21.8 22.0 13 METER 11 26.0 26.2 26.4 26.8
A 550 600 700 800 1000 1200 1400 1600 A
15.1 15.2 15.3 15.4 19 METER 16 17.6 17.7 17.8 18.0
B 120 M 2.5 2.6 2.8 3.0 90 M 3.5 4.0 4.5 60 M 5.0 5.5 6.0 49 M 6.35 B
9.5 9.6 9.7 9.8 31 METER 25 11.7 11.8 11.9 12.1
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Reduced Reproduction of Receiver Dial, Q122, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord-Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test-oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

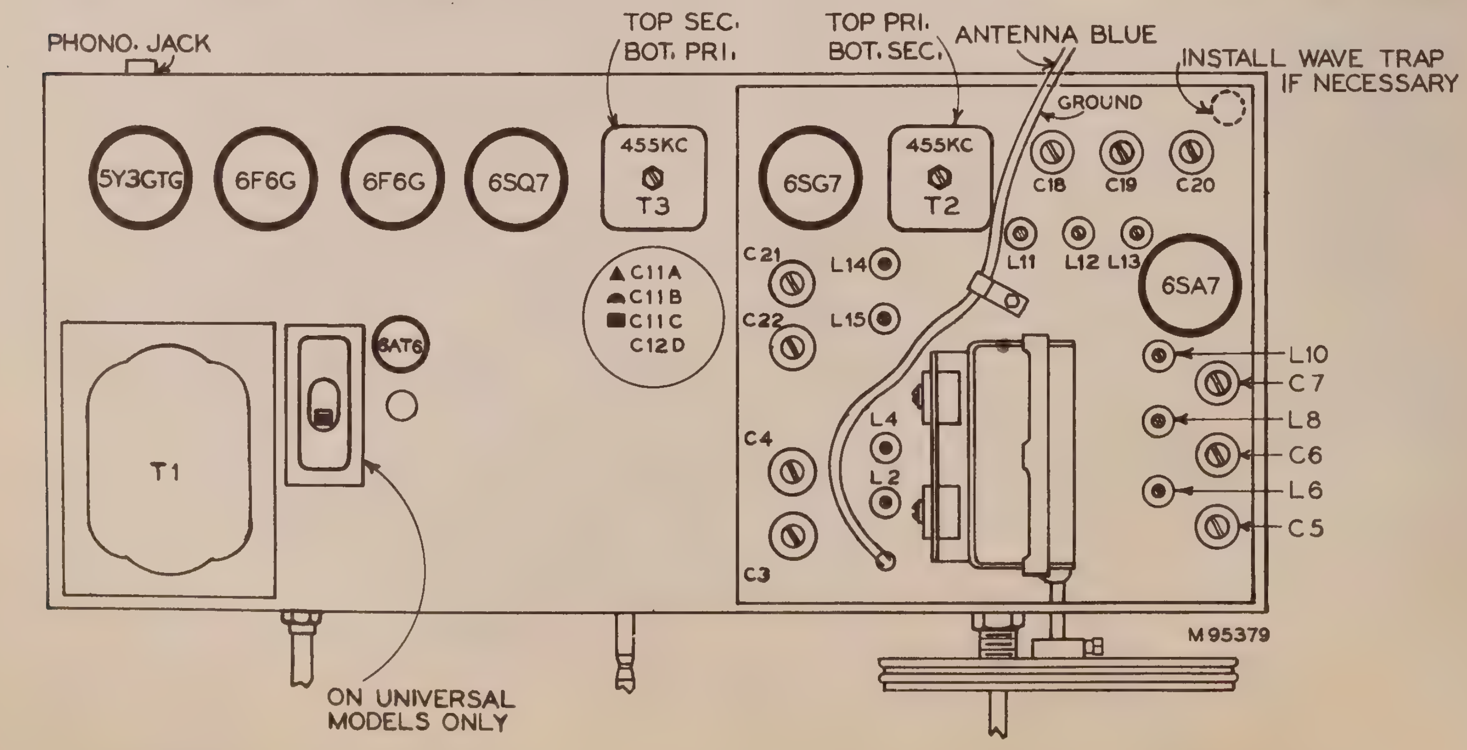
ALIGNMENT CHART Q122X

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn Radio dial to—	Adjust the following for max. peak output
1	6SG7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L19, L18 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L17, L16, 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	360 kc	"X" Band	360 kc (18°)	C22 osc. C7 ant.
4		160 kc		160 kc (134°)	L15 osc. L10 ant.
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C21 osc. C6 ant.
7		600 kc		600 kc (148°)	L14 osc. L8 ant.
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	7.2 mc	"49-40 Meter" Band	7.2 mc (45°)	C20 osc. C5 ant.
10		6.1 mc		6.1 mc (142°)	L13 osc. L6 ant.
11		11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C19 osc.* C4 ant. Rock in**
12		9.5 mc		9.5 mc (170°)	L12 osc. L4 ant.
13		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C18 osc.* C3 ant. Rock in**
14		15.2 mc		15.2 mc (156°)	L11 osc. L2 ant.

Oscillator tracks above signal on all bands.

* Use minimum capacity peak if two peaks can be obtained.

** Use maximum capacity peak if two peaks can be obtained.



ADJUST ALL TRIMMERS TO FREQUENCIES INDICATED IN ALIGNMENT CHART FOR MODEL DESIRED

Tube and Trimmer Locations (Top View)

ALIGNMENT CHART Q122

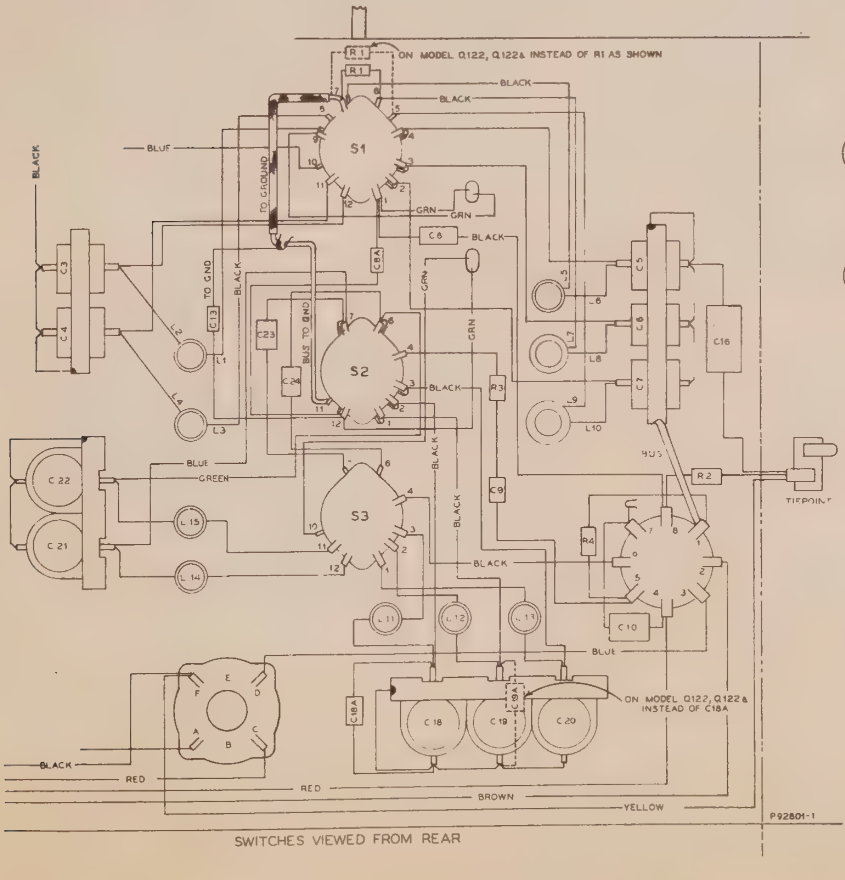
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn Radio dial to—	Adjust the following for max. peak output
1	6SG7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L19, L18 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L17, L16, 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C22 osc. C7 ant.
4		600 kc		600 kc (148°)	L15 osc. L10 ant.
5	Repeat Steps 3 and 4 until aligned				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C21 osc. C6 ant.
7		2.6 mc		2.6 mc (152°)	L14 osc. L8 ant.
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C20 osc.* C5 ant. Rock in**
10		9.5 mc		9.5 mc (170°)	L13 osc. L6 ant.
11		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C19 osc.* C4 ant. Rock in**
12		15.2 mc		15.2 mc (155°)	L12 osc. L4 ant.
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C3 ant. Rock in**
14		21.25 mc		21.25 mc (180°)	L11 osc. L2 ant.

Oscillator tracks above signal on all bands.
* Use minimum capacity peak if two peaks can be obtained.
** Use maximum capacity peak if two peaks can be obtained.

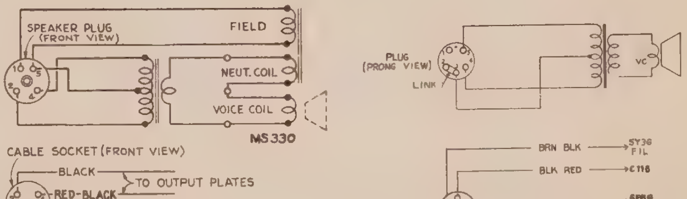
Use of Wave Trap.—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap as indicated in tube layout diagram. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot. Adjust capacitor to resonance with interfering station.

Critical Lead Dress

1. The green and black leads to the Volume Control should be tightly twisted and dressed down towards the chassis away from the 110/220 volt switch and away from the A.C. switch leads.
2. The A.C. switch leads should be twisted and dressed up away from all other leads.
3. The capacitor (C33) from the terminal board to Pin #2 of the 6SQ7 socket should be dressed down against the chassis. The capacitor leads to be cut as short as possible.
4. The capacitor (C30) from the terminal board on the front apron to the high side of the Volume Control should be dressed against the front apron.
5. The capacitor (C31) from the terminal board on the front apron to the low side of the Volume Control should be dressed against the front apron.
6. The capacitor (C8) from Pin #8 of the 6SA7 socket to the range switch should be dressed away from the chassis, range switch and coils.
7. The capacitor and resistor assembly C9 and R3 should be dressed mid-way between the coils L13 and L9 and dressed away from all parts and leads.
8. The capacitor (C16) from the terminal board, on end apron, to the trimmer strip, should be dressed against the end apron.
9. The resistor (R5) should be dressed away from the flywheel.
10. All leads and parts to the 6SA7 socket should have sufficient length to insure flexibility of socket.
11. All resistor and capacitor leads should be as short as possible.
12. All leads from the coils to range switch should be dressed away from each other and other parts.
13. All leads from the trimmer to range switch should be dressed away from coils and other parts.
14. The blue lead from terminal "E" of the 2nd I-F Transformer to S6 phono radio switch should be dressed close to the rear apron and under the clamps.
15. The capacitor (C38) from Pin #3 of the 6F6G socket to Pin #8 should be dressed down against the chassis base.
16. The capacitor (C39) from Pin #3 of the 6F6G socket to Pin #8 should be dressed away from the socket and speaker cable.
17. All excess power transformer leads should be dressed against the chassis and away from the tube sockets.
18. Slack in speaker cable to be as short as possible.
19. The resistor (R12) from Pin #1 to Pin #2 of the 6SQ7 socket should be as short as possible.
20. The capacitor (C35) from R13 tone control to Pin #7 of the 6F6G socket should be dressed away from the phono plug.
21. The resistor (R20) from Pin #1 to Pin #2 of the 6AT6 socket should be as short as possible.
22. All leads from range switch to stator section of gang should be dressed away from each other and should center in the cut-out.
23. Gang straps should be dressed to clear the rotor.
24. The leads to Pin #2, and #4 of the 6SA7 socket should be dressed down against the chassis and behind the trimmer strip.
25. The lead from Pin #3 of the 6SA7 socket to terminal "D" of the 1st I-F Transformer should be dressed down against the chassis and between the oscillator coils and trimmer strip.
26. The lead from terminal "F" of the 1st I-F Transformer to the terminal board on end apron should be dressed behind the trimmer strip.
27. Brown and black leads to the electrolytic capacitor should be dressed away from green and black Volume Control leads.
28. Pilot lamp lead should be dressed against the chassis under all other leads to 110/220 volt switch.


R1
ON MODEL Q122, Q122A INSTEAD OF R1 AS SHOWN
BLACK
BLUE
TO GROUND
S1
GRN
C8
C8A
TO GND
BUS TO GND
C3
C4
C13
C23
C24
L1
L2
L3
L4
S2
R3
L5
L6
L7
L8
L9
L10
C5
C6
C7
C16
BUS
R2
TIEPOINT
C22
C21
GREEN
S3
C9
R4
L15
L14
L11
L12
L13
C10
C18A
C18
C19
C20
C19A
ON MODEL Q122, Q122A INSTEAD OF C18A
E
D
C
B
A
F
RED
BROWN
YELLOW
P92801-1
SWITCHES VIEWED FROM REAR

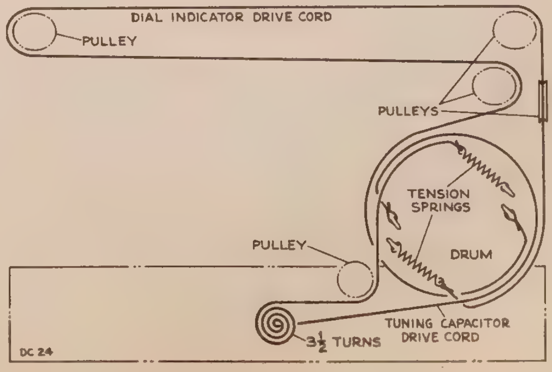
R. F. Wiring Diagram (Bottom View)


SPEAKER PLUG (FRONT VIEW)
FIELD
NEUT. COIL
VOICE COIL
MS330
CABLE SOCKET (FRONT VIEW)
BLACK
RED-BLACK
TO OUTPUT PLATES
BLK.-BRN.
TO OUTPUT SCREENS
BROWN
RECTIFIER FILAMENT
PLUG (PRONG VIEW)
LINK
VC
BRN BLK
5Y3G FIL
BLK RED
C11B
SOCKET (FACE VIEW)
BLK
6F6G PLATE
BLK RED TR
6F6G PLATE
MS329

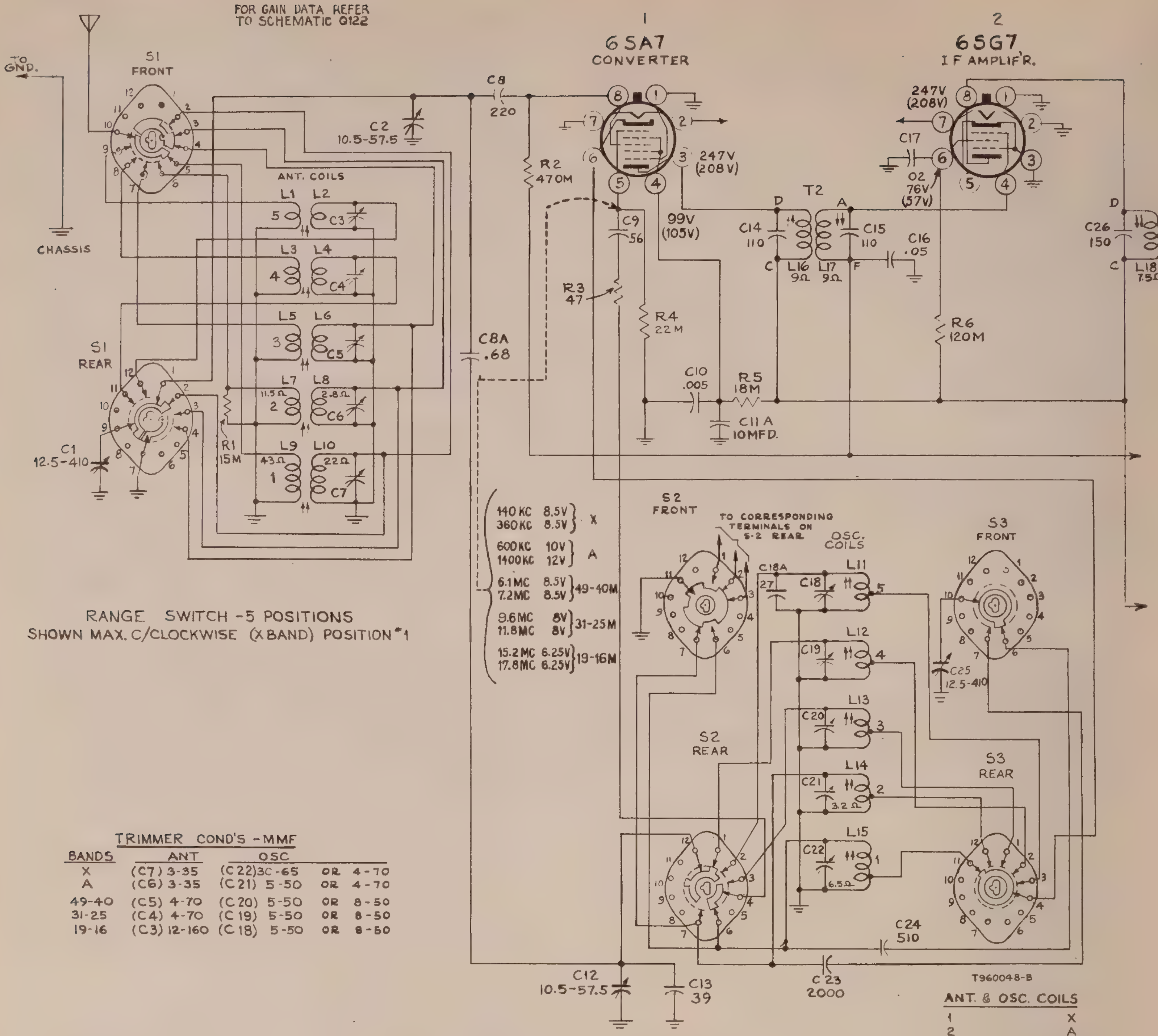
RC 601, RC 601A

RC 601D, RC 601E

Loudspeaker Connections


DIAL INDICATOR DRIVE CORD
PULLEY
PULLEYS
TENSION SPRINGS
PULLEY
DRUM
TUNING CAPACITOR DRIVE CORD
3½ TURNS
DC 24

Dial-Indicator and Drive Mechanism


FOR GAIN DATA REFER TO SCHEMATIC Q122
TO GND.
CHASSIS
S1 FRONT
S1 REAR
ANT. COILS
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10
C3 C4 C5 C6 C7
11.5Ω 2.8Ω 43Ω 22Ω
C1 12.5-410
R1 15M
C2 10.5-57.5
C8 220
C8A .68
R2 470M
1 6SA7 CONVERTER
247V (208V)
99V (105V)
C9 56
R3 47
R4 22M
C10 .005
R5 18M
C11A 10MFD.
2 6SG7 I F AMPLIF'R.
247V (208V)
C17
.02 76V (57V)
T2
C14 110
C15 110
L16 9Ω L17 9Ω
C16 .05
R6 120M
C26 150
L18 7.5Ω
S2 FRONT
TO CORRESPONDING TERMINALS ON S-2 REAR
OSC. COILS
C18A 27
C18 L11
C19 L12
C20 L13
C21 L14 3.2Ω
C22 L15 6.5Ω
S2 REAR
S3 FRONT
S3 REAR
C25 12.5-410
C24 510
C23 2000
C12 10.5-57.5
C13 39
T960048-B
RANGE SWITCH -5 POSITIONS
SHOWN MAX. C/CLOCKWISE (X BAND) POSITION #1

140 KC	8.5V	X
360 KC	8.5V	
600 KC	10V	A
1400 KC	12V	
6.1 MC	8.5V	49-40M
7.2 MC	8.5V	
9.6 MC	8V	31-25M
11.8 MC	8V	
15.2 MC	6.25V	19-16M
17.8 MC	6.25V	

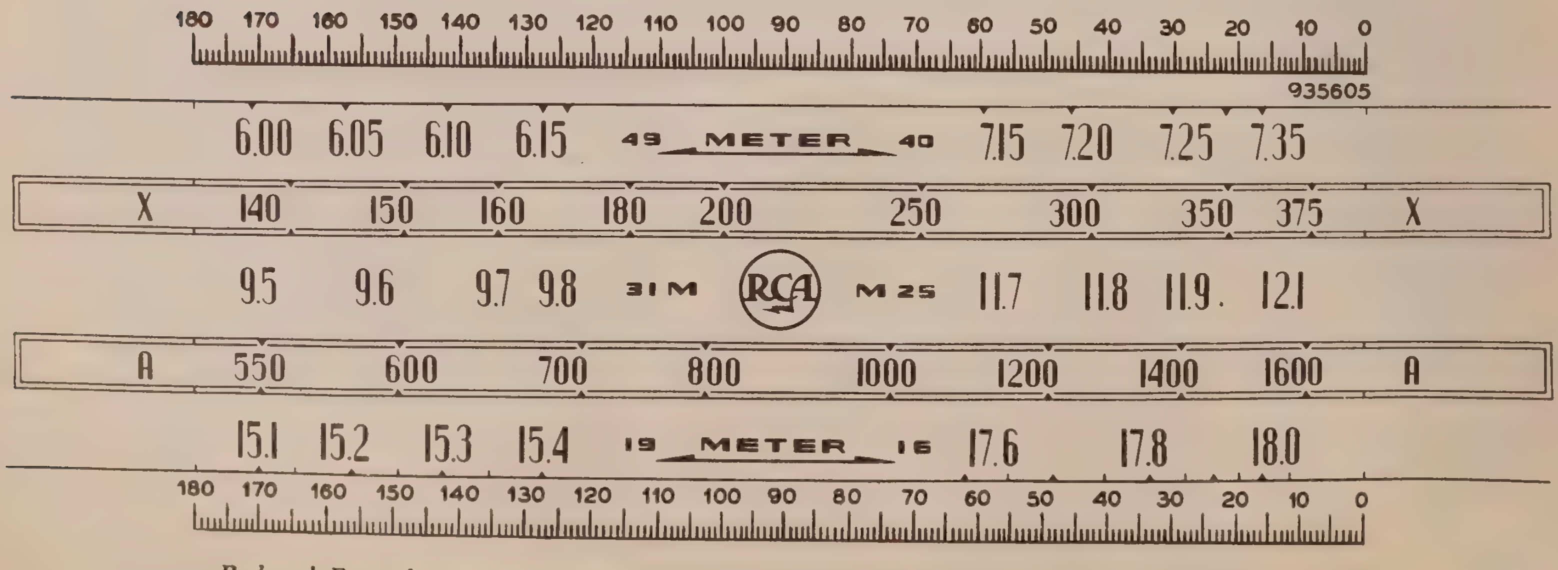
TRIMMER COND'S - MMF

BANDS	ANT	OSC		
X	(C7) 3-35	(C22) 3C-65	OR	4-70
A	(C6) 3-35	(C21) 5-50	OR	4-70
49-40	(C5) 4-70	(C20) 5-50	OR	8-50
31-25	(C4) 4-70	(C19) 5-50	OR	8-50
19-16	(C3) 12-160	(C18) 5-50	OR	8-50

ANT. & OSC. COILS

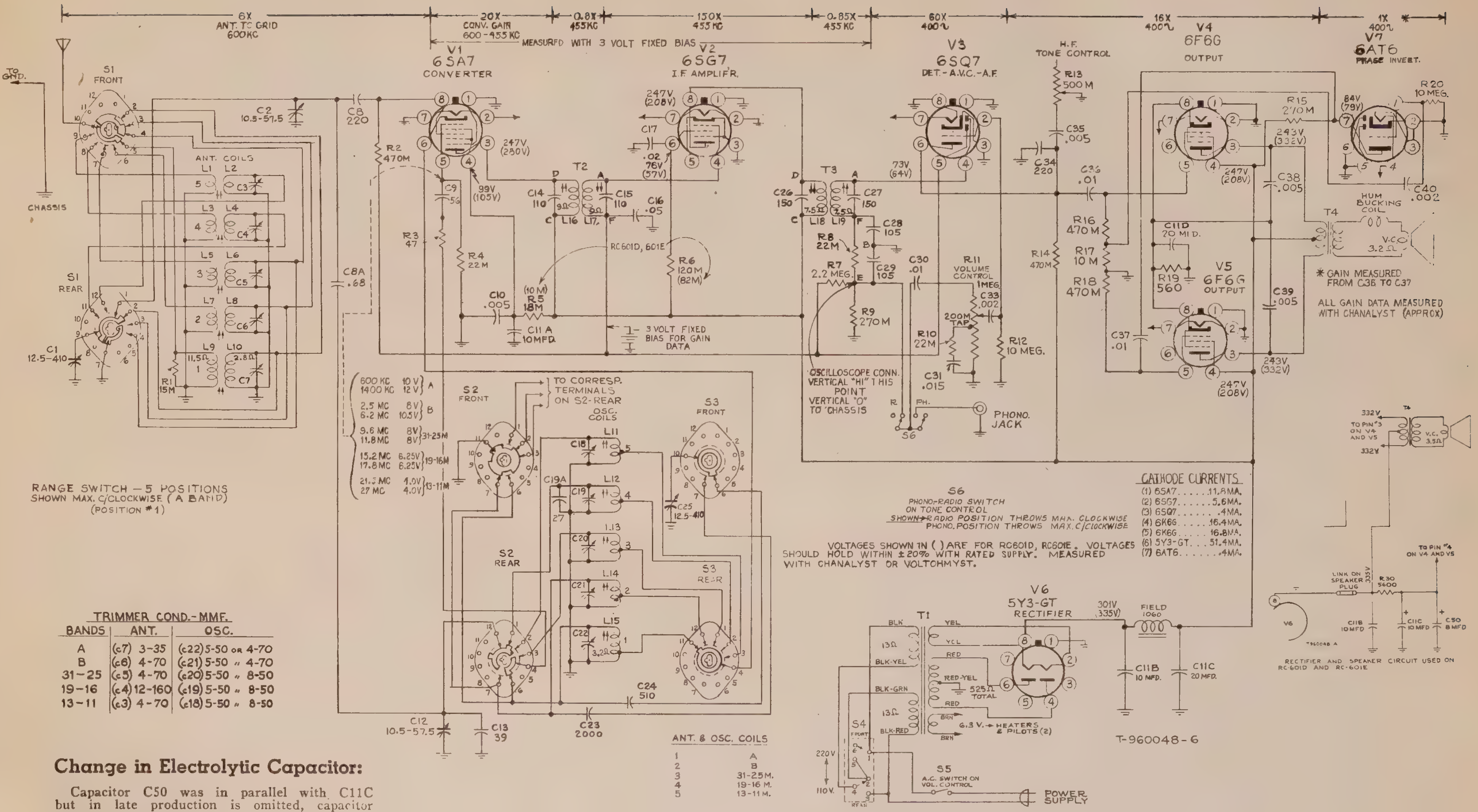
1	X
2	A
3	49-40 M
4	31-25 M
5	19-16 M

Schematic Diagram, Q122X, Q122Xa (R. F.)


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
935605
6.00 6.05 6.10 6.15 49 METER 40 7.15 7.20 7.25 7.35
X 140 150 160 180 200 250 300 350 375 X
9.5 9.6 9.7 9.8 31 M RCA M 25 11.7 11.8 11.9 12.1
A 550 600 700 800 1000 1200 1400 1600 A
15.1 15.2 15.3 15.4 19 METER 16 17.6 17.8 18.0
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

Reduced Reproduction of Receiver Dial, Q122X, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."


6X
ANT. TO GRID
600KC
20X
CONV. GAIN
600-455 KC
0.8X
455KC
150X
455KC
0.85X
455KC
60X
400~
16X
400~
1X
400~
MEASURED WITH 3 VOLT FIXED BIAS
V1
6SA7
CONVERTER
V2
6SG7
I.F. AMPLIFR.
V3
6SQ7
DET.-A.V.C.-A.F.
V4
6F6G
OUTPUT
V5
6F6G
OUTPUT
V7
6AT6
PHASE INVERT.
V6
5Y3-GT
RECTIFIER
TO GND.
CHASSIS
S1 FRONT
S1 REAR
ANT. COILS
C1 12.5-410
C2 10.5-57.5
C8 220
C8A .68
R1 15M
R2 470M
R3 47
R4 22M
C9 56
247V (250V)
99V (105V)
C10 .005
R5 18M (10M)
C11A 10MFD
T2
C14 110
C15 110
C16 .05
C17
.02
76V (57V)
247V (208V)
RC601D, 601E
R6 120M (82M)
3 VOLT FIXED BIAS FOR GAIN DATA
T3
C26 150
C27 150
C28 105
C29 105
R8 22M
R7 2.2 MEG.
R9 270M
OSCILLOSCOPE CONN. VERTICAL "HI" THIS POINT VERTICAL "O" TO CHASSIS
73V (64V)
C30 .01
R11 VOLUME CONTROL 1MEG.
200M TAP
C33 .002
R10 22M
C31 .015
R12 10 MEG.
PHONO. JACK
S6
H.F. TONE CONTROL
R13 500 M
C35 .005
C34 220
C36 .01
R14 470M
R16 470 M
R17 10 M
R18 470M
C37 .01
C11D 20 MFD.
R19 560
247V (208V)
C38 .005
C39 .005
243V (332V)
R15 270M
84V (79V)
R20 10 MEG.
C40 .002
HUM BUCKING COIL
T4
V.C. 3.2Ω
* GAIN MEASURED FROM C36 TO C37
ALL GAIN DATA MEASURED WITH CHANALYST (APPROX)
600 KC 10V, 1400 KC 12V A
2.5 MC 8V, 6.2 MC 10.5V B
9.6 MC 8V, 11.8 MC 8V 31-25M
15.2 MC 6.25V, 17.8 MC 6.25V 19-16M
21.5 MC 4.0V, 27 MC 4.0V 13-11M
S2 FRONT
TO CORRESP. TERMINALS ON S2-REAR
OSC. COILS
L11 L12 L13 L14 L15
C18 C19 C19A C20 C21 C22
C24 510
C23 2000
C12 10.5-57.5
C13 39
S2 REAR
S3 FRONT
S3 REAR
C25 12.5-410
RANGE SWITCH — 5 POSITIONS
SHOWN MAX. C/CLOCKWISE (A BAND)
(POSITION #1)
S6
PHONO-RADIO SWITCH
ON TONE CONTROL
SHOWN→RADIO POSITION THROWS MAX. CLOCKWISE
PHONO. POSITION THROWS MAX. C/CLOCKWISE
VOLTAGES SHOWN IN ( ) ARE FOR RC601D, RC601E. VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY. MEASURED WITH CHANALYST OR VOLTOHMYST.
CATHODE CURRENTS
(1) 6SA7......11.8MA.
(2) 6SG7......5.6MA.
(3) 6SQ7......4MA.
(4) 6K6G......16.4MA.
(5) 6K6G......16.8MA.
(6) 5Y3-GT...51.4MA.
(7) 6AT6......4MA.
332V
TO PIN #3 ON V4 AND V5
V.C. 3.5Ω
332V
TO PIN #4 ON V4 AND V5
LINK ON SPEAKER PLUG
335V
R30 5600
C11B 10MFD
C11C 10MFD
C50 8MFD
T960048 A
RECTIFIER AND SPEAKER CIRCUIT USED ON RC-601D AND RC-601E
T1
BLK
YEL
13Ω
BLK-YEL
RED
RED-YEL
525Ω TOTAL
BLK-GRN
13Ω
BLK-RED
BRN
6.3 V.→HEATERS & PILOTS (2)
301V (335V)
FIELD 1060
C11B 10 MFD.
C11C 20 MFD.
T-960048-6
S4 FRONT REAR
220V
110V.
S5 A.C. SWITCH ON VOL. CONTROL
POWER SUPPLY

TRIMMER COND.-MMF.

BANDS	ANT.	OSC.
A	(c7) 3-35	(c22) 5-50 or 4-70
B	(c6) 4-70	(c21) 5-50 " 4-70
31–25	(c5) 4-70	(c20) 5-50 " 8-50
19–16	(c4) 12-160	(c19) 5-50 " 8-50
13–11	(c3) 4-70	(c18) 5-50 " 8-50

ANT. & OSC. COILS

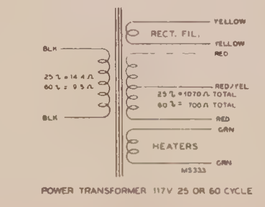
1	A
2	B
3	31-25M.
4	19-16M.
5	13-11M.

Change in Electrolytic Capacitor:

Capacitor C50 was in parallel with C11C but in late production is omitted, capacitor C11C was 10 mfd. but is now 20 mfd.

Additional Critical Lead Dress:

29. Speaker cable leads should be as short as possible and dressed down close to the chassis and away from capacitor C33 and terminal board.
30. The lead from the tone control switch to the terminal board on front apron should be dressed up and back towards the end apron away from the A.C. switch leads.
31. The resistor R30 should be dressed up and away from all other parts and leads.


YELLOW
RECT. FIL.
YELLOW
RED
BLK
RED/YEL
25~ 410 Ω TOTAL
60~ 700 Ω TOTAL
RED
GRN
BLK
HEATERS
GRN
POWER TRANSFORMER 117V 25 OR 60 CYCLE

Schematic Diagram, Q122, Q122a

NOTE: In some sets and on some replacement units, the power transformer color code may vary from that shown. On universal transformers (Rating C), the primary No. 1 start may be red; primary No. 1 finish red/black; primary No. 2 start red/yellow; primary No. 2 finish black/red. On the 25 and 60 cycle transformers (Ratings A and B), the primary start and finish may be red. Secondaries of the three transformers would be: rectifier filament, green/red; high-voltage, brown; high-voltage center tap, black/brown; amplifier filament, blue. In case of doubt, identify windings by resistance or voltage measurements.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 601—Q122, RC 601A—Q122X RC 601D—Q122α, RC 601E—Q122Xα
35640	Bracket—Drive cord pulley support bracket complete with one (1) pulley
35639	Bracket—Drive cord pulley support bracket complete with three (3) pulleys
35642	Calibrator—Drive drum calibrator
71587	Capacitor—Molded paper, .005 mmfd., 600 volts (C10)
71088	Capacitor—Molded, 0.68 mmfd. (C8α)
70933	Capacitor—Mica trimmer comprising 2 sections of 3-35 mmfd., and 1 section of 4-70 mmfd. (for Models Q122X, Q122Xα) (C5, C6, C7)
70932	Capacitor—Mica trimmer comprising 2 sections of 4-70 mmfd. and 1 section of 3-35 mmfd. (for Models Q122, Q122α) (C5, C6, C7)
70745	Capacitor—Mica trimmer comprising 1 section of 12-160 mmfd. and 1 section of 4-70 mmfd. (for Models Q122, Q122α) (C3, C4)
70754	Capacitor—Mica trimmer comprising 1 section of 4-70 mmfd. and 1 section of 12-160 mmfd. (for Models Q122X, Q122Xα) (C3, C4)
70778	Capacitor—Ceramic trimmer, dual 5-50 mmfd. (for Model Q122, Q122α) (C21, C22)
70798	Capacitor—Ceramic trimmer comprising 1 section of 30-65 mmfd. and 1 section of 5-50 mmfd. (for Models Q122X, Q122Xα) (C21, C22)
70931	Capacitor—Ceramic trimmer, triple 5-50 mmfd. (C18, C19 C20 for Q122, Q122α)
72947	Capacitor—Mica trimmer, dual 4-70 mmfd. (C21, C22)
72948	Capacitor—Ceramic trimmer, triple 8-50 mmfd. (C18, C19, C20)
	Stock No. 72947 is interchangeable electrically but not mechanically with Stock Nos. 70778 or 70798. Stock No. 70948 is interchangeable electrically but not mechanically with Stock No. 70931. To interchange mechanically requires new mounting holes.
70935	Capacitor—Ceramic, 27 mmfd. (C19A for Q122; C18A for Q122X, Q122Xα)
70934	Capacitor—Ceramic, 39 mmfd. (C13)
71924	Capacitor—Ceramic, 56 mmfd. (C9)
71933	Capacitor—Mica, 180 mmfd. (C24 for Q122X, Q122Xα)
71014	Capacitor—Mica, 220 mmfd. (C8, C34)
71932	Capacitor—Mica, 510 mmfd. (C24 for Q122, Q122α; C23 for Q122X, Q122Xα)
53538	Capacitor—Mica, 2000 mmfd. (C23 for Q122, Q122α)
71136	Capacitor—Molded paper, .002 mfd., 200 volts (C33, C40)
71593	Capacitor—Molded paper, .005 mfd., 600 volts (C35)
72220	Capacitor—Molded paper, .005 mfd., 1000 volts (C38, C39)
71585	Capacitor—Molded paper, .01 mfd., 200 volts (C30)
71588	Capacitor—Molded paper, .01 mfd., 600 volts (C36, C37)
71135	Capacitor—Molded paper, .015 mfd., 200 volts (C31)
71591	Capacitor—Molded paper, .02 mfd., 600 volts (C17)
71586	Capacitor—Molded paper, .05 mfd., 200 volts (C16)
33195	Capacitor—Electrolytic, comprising 1 section 20 mfd., 450 volts (C11C), 2 sections 10 mfd., 450 volts (C11A, C11B), 1 section 20 mfd., 25 volts (C11D)
70830	Clip—Core and stud retaining clip
70726	Clip—Spring clip to hold adjustable core and stud
70923	Coil—Antenna coil—13 meter band (L1, L2 for Q122, Q122α)
70920	Coil—Oscillator coil—13 meter band (L11 for Q122, Q122α)
70924	Coil—Antenna coil—19 meter band (L3, L4 for Q122, Q122α; L1, L2 for Q122X, Q122Xα)
70823	Coil—Oscillator coil—19 meter band (L12 for Q122, Q122α; L11 for Q122X, Q122Xα)
70925	Coil—Antenna coil—31 meter band (L5, L6 for Q122, Q122α; L3, L4 for Q122X, Q122Xα)
70825	Coil—Oscillator coil—31 meter band (L13 for Q122, Q122α; L12 for Q122X, Q122Xα)
70928	Coil—Antenna coil—49 meter band (L5, L6 for Q122X, Q122Xα)
70921	Coil—Oscillator coil—49 meter band (L13 for Q122X, Q122Xα)
70927	Coil—Antenna coil—"A" band (L9, L10 for Q122, Q122α; L7, L8 for Q122X, Q122Xα)
70789	Coil—Oscillator coil—"A" band (L15 for Q122, Q122α; L14 for Q122X, Q122Xα)
70926	Coil—Antenna coil—"B" band (L7, L8 for Q122, Q122α)
70829	Coil—Oscillator coil—"B" band (L14 for Q122, Q122α)
70929	Coil—Antenna coil—"X" band (L9, L10 for Q122X, Q122Xα)
70922	Coil—Oscillator coil—"X" band (L15 for Q122X, Q122Xα)
70727	Condenser—Variable tuning condenser (C1, C2, C12, C25)
70828	Control—Tone control and radio-phono switch (R13, S6)
70826	Control—Volume control and power switch (R11, S5)
32634	Cord—Drive cord (approx. 29" overall length)
34662	Cord—Indicator drive cord (approx. 54" overall length)
70831	Core—Adjustable core and stud for I-F transformers
70940	Core—Adjustable core and stud for Models Q122, Q122α, 13 meter band oscillator coil
70937	Core—Adjustable core and stud for 19 meter band oscillator coil
70939	Core—Adjustable core and stud for "A" band oscillator coil
70943	Coil—Adjustable core and stud for 19 meter band and "A" band antenna coils
70945	Core—Adjustable core and stud for Models Q122X, Q122Xα. "X" band antenna coil
70942	Core—Adjustable core and stud for Models Q122X, Q122Xα, "X" and oscillator coil
70938	Core—Adjustable core and stud for 31 meter band oscillator coil and for Models Q122, Q122α, "B" band oscillator coil
70944	Core—Adjustable core and stud for 31 meter band antenna coil; for Models Q122, Q122α, "B" band antenna coil and for Models Q122X, Q122Xα, 49 meter band antenna coil
70941	Core—Adjustable core and stud for Models Q122X, Q122Xα, 49 meter band and for Models Q122, Q122α, 13 meter band antenna coil
35627	Drum—Drive drum
70429	Grommet—Rubber grommet to mount tube socket (2 req'd)
70930	Grommet—Rubber grommet to mount tuning condenser (4 req'd)
35638	Flywheel—Tuning shaft flywheel
5040	Plug—4 contact female plug for speaker cable (Q122, Q122X)
12493	Plug—5 contact female plug for speaker cable (Q122α, Q122Xα)
35630	Pulley—Drive cord idler pulley—located between range switch and tuning shaft
35641	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R3)
90381	Resistor—560 ohms, 1 watt (R19)
72218	Resistor—5600 ohms, 4 watt (R30) (Q122α, Q122Xα)
3078	Resistor—10,000 ohms, ½ watt (R17)
36714	Resistor—15,000 ohms, ½ watt (R1)
39158	Resistor—18,000 ohms, 2 watt (R5)
30492	Resistor—22,000 ohms, ½ watt (R4, R8, R10)
30180	Resistor—120,000 ohms, ½ watt (R6)
30651	Resistor—270,000 ohms, ½ watt (R9, R15)
30648	Resistor—470,000 ohms, ½ watt (R2, R14, R16, R18)
30649	Resistor—2.2 megohms, ½ watt (R7)
30992	Resistor—10 megohms, ½ watt (R12, R20)
14350	Screw—#8-32 square head set screw for drive drum
70832	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
70827	Socket—Tube socket
36500	Socket—Tube socket, miniature
31319	Socket—Tube socket with mounting plate
31418	Spring—Indicator cord or drive cord spring
35622	Support—Flywheel support bracket
70732	Switch—Range switch (S1, S2, S3)
32827	Switch—Voltage change switch (S4)
70917	Transformer—First I-F transformer (T2, L16, L17, C14, C15)
70918	Transformer—Second I-F transformer (T3, L18, L19, C26, C27, C28, C29)
35588	Transformer—Power transformer, 117 volts, 25 cycles (T1)
32852	Transformer—Power transformer, 117/235 volts, 60 cycles (T1)
33726	Washer—"C" washer for tuning shaft and idler pulley
	SPEAKER ASSEMBLY 92517-1J (For RC 601, RC 601A only)
70578	Cone—Cone and voice coil assembly
5118	Plug—4 prong male speaker plug
70583	Speaker—6½" EM speaker complete with cone and voice coil less output transformer and plug
70584	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	SPEAKER ASSEMBLY 92570-1J (For RC 601D, RC 601E only)
72520	Cone—Cone and voice coil assembly
71560	Plug—5 prong male speaker plug
72425	Speaker—6½" PM speaker complete with cone and voice coil less output transformer and plug
72425	Transformer—Output transformer (T4)
	SPEAKER ASSEMBLIES 92570-1M (For RC 601D, RC 601E only)
73040	Cone—Cone and voice coil assembly
31539	Plug—5 prong speaker plug
72426	Transformer—Output transformer
	NOTE: When replacing complete speaker use speaker stamped 92570-1J (Stock No. 72425)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70834	Back—Cabinet back
70833	Board—Baffle board and grille cloth
Y1351	Cabinet—Plastic cabinet
71089	Decal—Trade mark decal for Q122, Q122α
70981	Dial—Glass dial scale for Q122, Q122α
70982	Dial—Glass dial scale for Q122X, Q122Xα
35647	Frame—Dial back plate complete less indicator and dial
70839	Grommet—Rubber grommet for chassis mounting
37396	Grommet—Rubber grommet for speaker mounting
70580	Indicator—Station selector indicator
70837	Knob—Range switch knob for Q122, Q122α
70838	Knob—Range switch knob for Q122X, Q122Xα
70835	Knob—Tone control knob
70836	Knob—Tuning or volume control knob
11891	Lamp—Dial lamp
14270	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

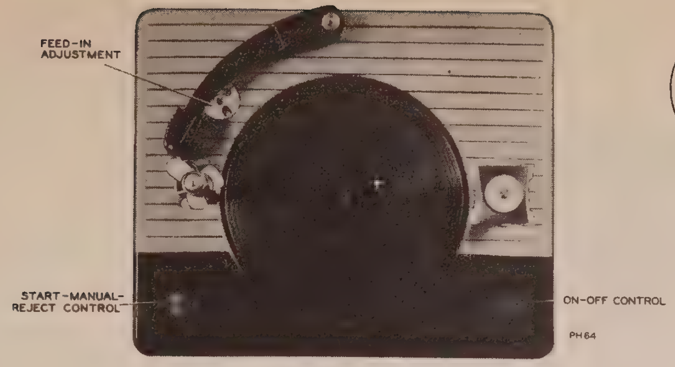
RP-176-176A-176B

Automatic Record Changer

SERVICE DATA

—1946 No. 12—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



Note: See page 10 for the differences between various models.

FEATURES

1. This record changer is a two-support, drop type, non-intermixing mechanism designed to play automatically a series of twelve ten-inch or ten twelve-inch records of the standard 78 RPM type.
2. The mechanism uses a lightweight, low-noise, crystal pickup cartridge, equipped with a long-life sapphire point.
3. The tone arm is automatically returned to rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric tripping device which insures tripping on all standard records.
5. A pickup muting switch is incorporated, which shorts out the pickup while the changer is in cycle. This prevents mechanical noise of moving parts from being amplified.
6. The record support and separator are mechanically linked, requiring only one operation for changing of record size.
7. Moving parts are few in number while playing records. This insures quiet reproduction, free from rumble and wow.
8. The mechanism is provided with a safety clutch which prevents damage to the mechanism in case of a jam due to a defective record.
9. The accessible feed-in adjustment is positive in action.

MANUAL OPERATION

1. Make certain the mechanism is out of cycle with the pickup on the rest.
2. Push "Start-Reject" knob to manual position.
3. Place record on turntable and push the power switch to the "on" position.
4. Lift and place pickup on record.
5. When the selection has finished playing, the pickup will continue to ride in the eccentric groove until the pickup is lifted from the record or the power is removed from the drive motor.

LUBRICATION

A light machine oil (SAE #10) should be used to oil the bearings of the drive motor.

On all bearing surfaces, excepting the motor bearings, Houghton STA-PUT No. 320, or equivalent, should be used. On all other surfaces, STA-PUT No. 512, or equivalent, is recommended. STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa.

(Do not oil or grease record separator shaft.)

It is important that the drive motor spindle and the rubber tire on the friction disc as well as that on the idler wheel be kept clean and free from oil or grease, dirt, or any foreign material at all times. Carbon tetrachloride or naphtha is satisfactory for cleaning these parts.

AUTOMATIC OPERATION

The pickup "rest" consists of a post incorporating a button and shaft connecting a switch beneath the motor board. This switch, which controls the power to the drive motor, is actuated by the weight of the pickup and tone arm while going in and out of rest position.

1. Turn the record support on the right-hand side of the changer, to position it for 10- or 12-inch records.
2. Load the records on the supports with the desired selections upward, the last record to be played on top. (Make certain the separator shelf is pushed down when stack is placed on the supports.)
3. Push the "On-Off" knob to the "on" position.
4. Push "Manual-Reject" knob to reject position and release. The mechanism will automatically play in sequence, one side of each record stacked on the supports. After completing the selection on the last record the tone arm will return to rest position and the power will be removed from drive motor.
5. To reject a record being played, push the "Manual-Reject" knob to "Reject" and release.
6. Lift and turn separator shelf to facilitate the removal of records.
   (**Note:** For automatic operation, each record is required to have the standard eccentric groove.)

Cautions

Before servicing the automatic changer, inspect the assembly to see that all gears, cams, springs, levers, etc., are correctly assembled and in good working order.

1. Never use force to start or stop the motor or any part of the record changing mechanism.
2. Warped or damaged records may cause the mechanism to jam. **When jamming occurs, the safety clutch slips, causing a clicking sound.**
3. A cracked or chipped record may damage the sapphire.
4. Warped records may slide on one another while playing and result in unsatisfactory reproduction.
5. Do not leave the records on the record posts or on the turntable as they may warp, particularly in warm climates. Warped records may be flattened by placing them on a flat surface with a heavy flat article placed on top of them for a few days.
6. If, for any reason, the mechanism stalls, turn off the "On-Off" switch and remove the records from the posts. Start the turntable by turning the switch on and allow the pickup arm to complete its cycle.
7. Do not tighten copper-plated, cone-pointed screws until final adjustment has been made.

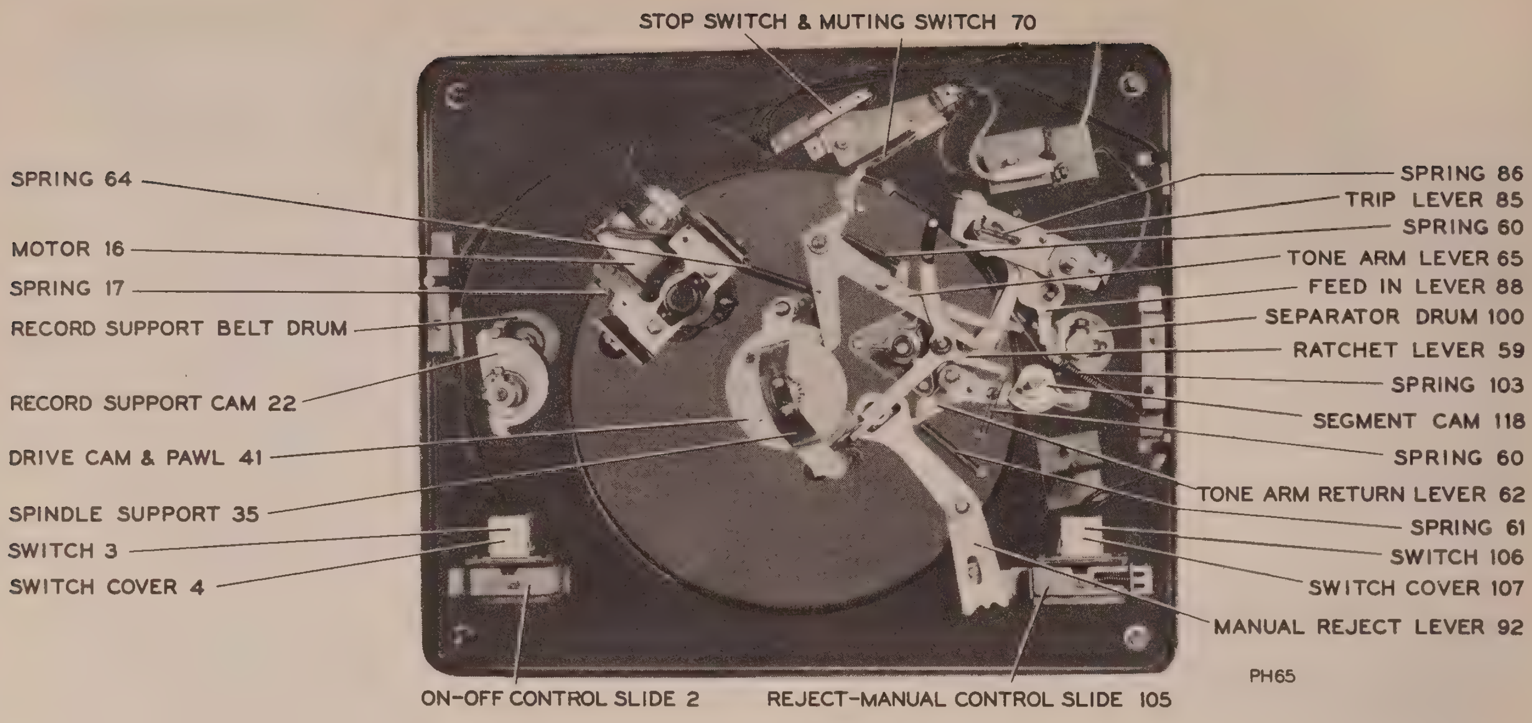

STOP SWITCH & MUTING SWITCH 70
SPRING 64
MOTOR 16
SPRING 17
RECORD SUPPORT BELT DRUM
RECORD SUPPORT CAM 22
DRIVE CAM & PAWL 41
SPINDLE SUPPORT 35
SWITCH 3
SWITCH COVER 4
SPRING 86
TRIP LEVER 85
SPRING 60
TONE ARM LEVER 65
FEED IN LEVER 88
SEPARATOR DRUM 100
RATCHET LEVER 59
SPRING 103
SEGMENT CAM 118
SPRING 60
TONE ARM RETURN LEVER 62
SPRING 61
SWITCH 106
SWITCH COVER 107
MANUAL REJECT LEVER 92
PH65
ON-OFF CONTROL SLIDE 2
REJECT-MANUAL CONTROL SLIDE 105

FIG. 1

FUNCTION OF PRINCIPAL PARTS

Trip Lever 85

When the pickup is riding in the eccentric groove, the trip pawl located on the trip lever engages the ratchet lever, starting the cycle.

Ratchet Lever 59

Portion of lever acts as a ratchet and the other portion acts as a stop or catch to hold the drive clutch from engaging.

Ratchet Wheel (fig. 4)

Acts as part of the safety clutch, which is engaged with the cam pawl during cycle.

Drive Cam, Gear and Pawl 41

Transfers motion from turntable through clutch to main gear.

Turntable Spindle Support 35

Forms a bearing for turntable spindle.

Main Cam 67 (fig. 2)

Has a series of tracks controlling cycling action.

Record Separator Lever, Link, Crank 97 (fig. 2)

Transfers motion from the main cam through the stud, lever and link to the separator post during change cycle.

Feed-in Lever Locking Pawl or Latch 130 (fig. 3)

Provides a means of locking feed-in lever until the pickup has landed on the record, then unlatching and allowing feed-in lever to gently push the pickup into starting groove.

Manual-Reject Control Knob and Lever Assembly

In "**manual**" **position**, it contacts the stud on clutch portion of drive cam thereby preventing the clutch from engaging and starting cycle.

In "**automatic**" **position**, it permits operation of the ratchet lever safety clutch and stop switch.

In "**start reject**" **position**, it momentarily closes control switch which is shunted across stop switch. It also moves the ratchet lever away from drive cam pawl, permitting the clutch to engage and start cycle.

Muting Switch Actuating Lever 133 (fig. 3)

Opens pickup muting switch during the playing cycle.

Tone Arm Lever 65

Directs horizontal motion of tone arm. It also incorporates an additional retard lever which stabilizes tone arm while the mechanism is in cycle.

Tone Arm Return Lever 62

Moves the tone arm inward and provides positioning for landing.

Feed-in Lever 88

A small lever under spring tension providing a small amount of force inward on tone arm, after the pickup has landed on record.

Tone Arm Elevating Lever 125 (fig. 2)

Directs vertical motion of tone arm.

Tone Arm Elevating Rod 79

Transfers motion from elevating lever to tone arm.

Record Support Cam 22

Functions as a lock for record support belt drum.

Record Support Belt and Drum 24-99-100

Forms a mechanical linkage between record support and record separator.

Record Support

Provides a support for the record stack and a handle for record size change.

Record Separator Post and Blade

Functions to support the records and, together with the selector blade, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

Shut-off or Segment Cam 118

Locks tone arm return lever preventing it from pushing the tone arm in for landing.

Retainer Spring 132 (fig. 3)

A small piece of phosphor-bronze functioning as a partial lock which stabilizes the tone arm when in the outermost position.

Stop Spring 131

A small piece of spring steel used as a stop, which determines the outermost position of tone arm. (Adjustable.)

Timing Notch on Main Cam and Gear:

The timing notch originally in the rim of the main cam and gear is no longer used, instead a small metal projection has been added to the inside of the rim of the main cam and gear for the same purpose.

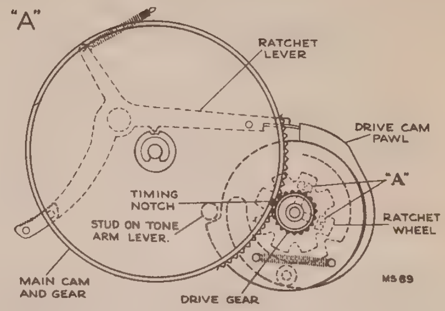
Quick-Reference Chart for Automatic Record Changer Adjustments

---

Mechanism jams. General irregularity of operation.

(Mechanism Timing)

With the ratchet lever and the pawl on the drive shaft cam in playing position as shown, remove the bottom support bracket, link and lever assembly. Remove the "C" washer on the main cam shaft and slip the cam down far enough that it can be rotated with respect to the drive gear. Then rotate it until the timing notch is positioned as shown. Put the main gear back in mesh with the drive gear, replace the "C" washer, place the elevating lever on the cam ridge. Make certain the separator link and lever assembly is in its correct position and replace the bottom support bracket.


"A"
RATCHET LEVER
DRIVE CAM PAWL
"A"
TIMING NOTCH
STUD ON TONE ARM LEVER.
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS 89

Records strike separator post or fail to stay on record shelf.

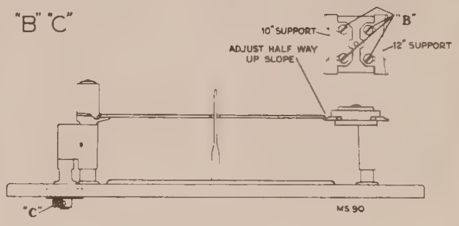
(Spacing Between Record Posts)

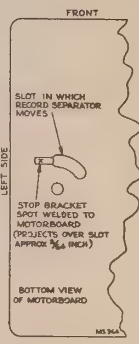
Turn the record support post to the ten-inch position. Loosen set screws "C," hold the separator post against the end of its slot in the motorboard and turn the belt drum to take up any slack in the belt. Tighten the zinc-plated, blunt-nosed screw and check to see that a ten-inch record fits the posts as shown. Then tighten the copper-plated, cone-pointed screw. Loosen set screws "B" and adjust support shelf so both 10- and 12-inch records set half-way up the slope when support post is turned to their respective positions.

Note:—

On later models a small piece of metal (stop bracket) has been welded to the motor board to improve the separation and dropping of the twelve-inch records.

Bending the metal limits the outward movement of the record separator post, and in so doing makes it possible to equalize the distances between the spindle and the record support and separator posts.


"B" "C"
10" SUPPORT
"B"
ADJUST HALF WAY UP SLOPE
12" SUPPORT
"C"
MS 90

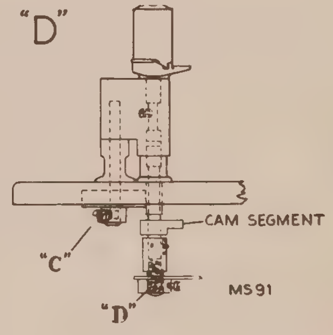

FRONT
SLOT IN WHICH RECORD SEPARATOR MOVES
LEFT SIDE
STOP BRACKET SPOT WELDED TO MOTORBOARD (PROJECTS OVER SLOT APPROX 3/64 INCH)
BOTTOM VIEW OF MOTORBOARD
MS 364

Records do not drop at proper time.

(Record Shelf Timing)

With the record supports turned to ten-inch position, place a ten-inch record on the supports. Loosen the set screws "D" and turn the record separator shaft until the edge of the record-separating knife is $\frac{3}{32}$ inch away from the edge of the record. The teeth on the inner circumference of the knife should be resting in the bottom of their slots at the time the adjustment is made. Tighten the zinc-plated screw first, run through cycle several times as a check, then tighten the copper-plated screw.

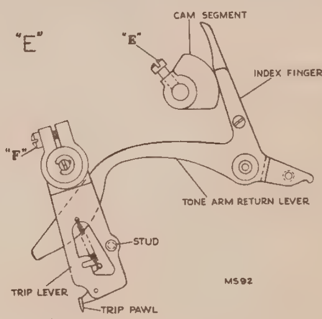
Note: It may be found necessary to deviate slightly from $\frac{3}{32}$ inch dimension if twelve-inch records do not drop properly.


"D"
CAM SEGMENT
"C"
"D"
MS 91

Tone arm continues to repeat playing of top record or jams when part way in on record.

(Segment-cam height or radial position)

With record changer in the ten-inch position and the records removed from the posts, loosen the set screw "E." Set the record separator segment-cam so that the index finger of the tone arm return lever rides on the middle of the segment-cam, as shown. Rotate the segment-cam until it is in such a position that the index finger will not ride off either end. Check to see that the index finger rides in over top of the cam when the record shelf is depressed by the weight of one record. Tighten the set screw.


"E"
CAM SEGMENT
"E"
INDEX FINGER
"F"
TONE ARM RETURN LEVER
STUD
TRIP LEVER
TRIP PAWL
MS 92

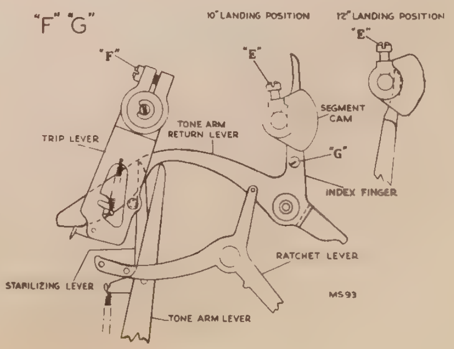
Sapphire does not land at correct point on 10-inch record.

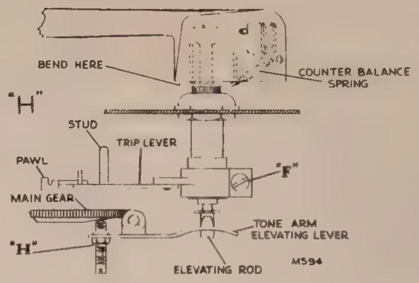
(Tone Arm Position With Respect To Trip Lever)

Correct dimension from outside edge of spindle to sapphire $4\frac{11}{16}$ inches.

With the record changer in the ten-inch position, place a ten-inch record on the turntable and rotate the changer through cycle by hand, until the sapphire is just ready to land. Make certain that the index finger of the pickup arm return lever is against the record separator shaft and that the tone arm trip lever stud is held firmly against the return lever. Loosen the set screw "F" and move the pickup arm to the correct landing position. Maintain correct alignment between ratchet lever and trip pawl, when tightening set screw "F." (Note—Make certain trip lever stud does not come in contact with motorboard while making this adjustment.)

Place a twelve-inch record on the turntable and rotate the changer through cycle until the sapphire is just ready to land. Loosen screw "G" and adjust end of tone arm return lever so it is against separator shaft when pickup is in correct landing position.


"F" "G"
10" LANDING POSITION
12" LANDING POSITION
"E"
"F"
"E"
SEGMENT CAM
TRIP LEVER
TONE ARM RETURN LEVER
"G"
INDEX FINGER
RATCHET LEVER
STABILIZING LEVER
TONE ARM LEVER
MS 93

Top of tone arm strikes stack of records or sapphire fails to clear the records on the turntable. **(Tone Arm Height While In Cycle)**	Rotate the changer through cycle until the tone arm has risen to its maximum height above the turntable but has not begun to move out. At this point adjust the screw "H" until the distance between the turntable and the sapphire is one and three-sixteenths inches. Tighten the locknut.	 BEND HERE COUNTER BALANCE SPRING "H" STUD TRIP LEVER PAWL "F" MAIN GEAR TONE ARM ELEVATING LEVER "H" ELEVATING ROD MS94
(Tone Arm Height While Out of Cycle)	Bend end of tone arm support bracket or pivot arm so the pickup end of tone arm clears the motorboard by $^3/_{32}$ inch.	

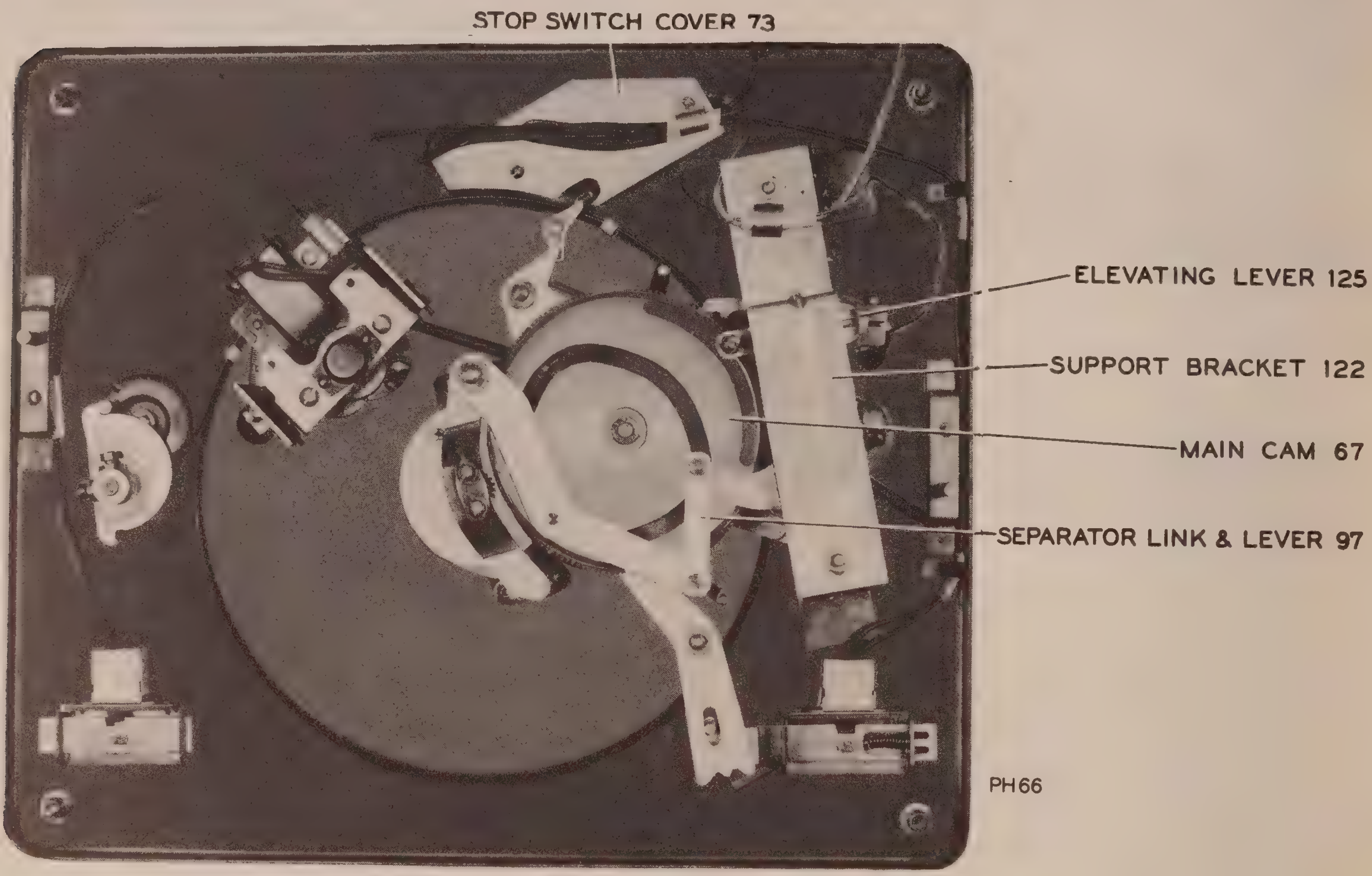
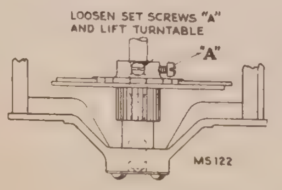
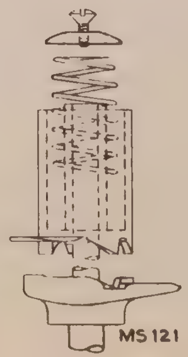
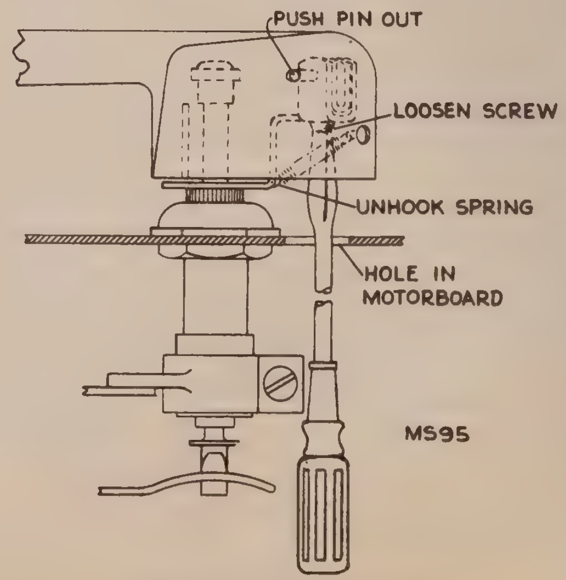

STOP SWITCH COVER 73
ELEVATING LEVER 125
SUPPORT BRACKET 122
MAIN CAM 67
SEPARATOR LINK & LEVER 97
PH66

FIG. 2

To remove turntable loosen set screws "A" and lift the turntable.  LOOSEN SET SCREWS "A" AND LIFT TURNTABLE "A" MS122	To remove separator knife, loosen top screw and entire assembly can be dismantled as shown in drawing. 	 PUSH PIN OUT LOOSEN SCREW UNHOOK SPRING HOLE IN MOTORBOARD MS95 REMOVING TONE ARM

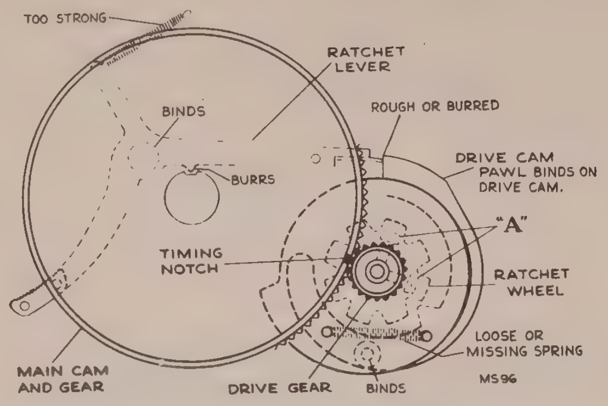
Cycle of Operation

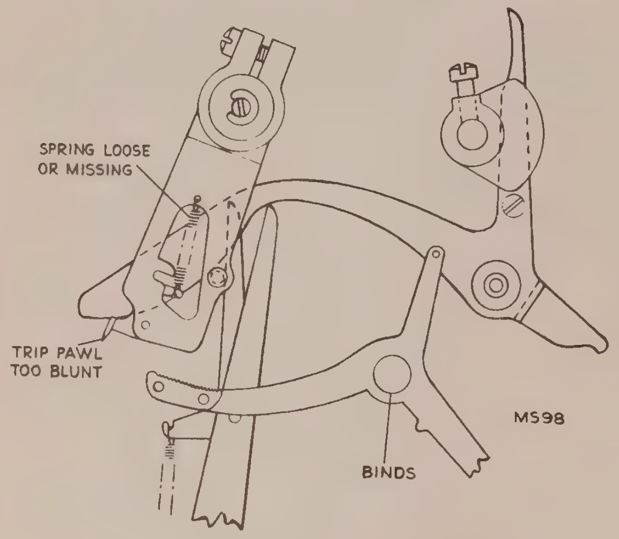
The changer can be conveniently rotated through the change cycle by pushing the reject knob and revolving the turntable by hand. Eight turntable revolutions are required for one change cycle. Block up the motor, so it is disengaged from the drive disc, to permit easier manual rotation of the turntable.

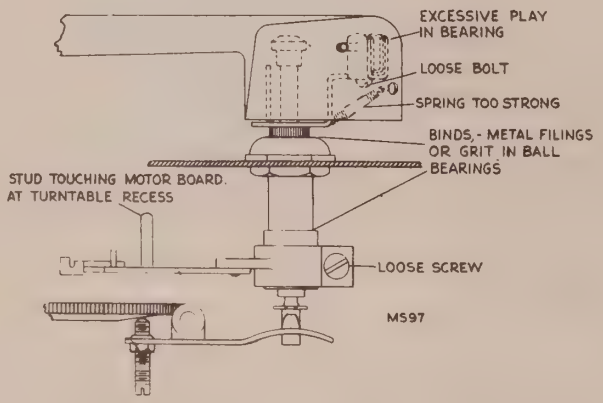
	Function	Explanation
Operator	**Turn Record Support to 10″ or 12″ Position as Desired**	1. Separator post positions itself by means of belt drive.
	Place Records on Posts	1. Separator shaft is pushed down against its spring and carries segment-cam out of path of index finger.
	Push Start Knob	1. Switch connected to start knob momentarily applies power to drive motor until tone arm is raised from stop button. 2. Manual-reject lever pushes ratchet lever. 3. Ratchet lever is pushed out of step on main gear shaft and releases drive cam pawl. 4. Drive cam pawl engages cam sprocket and it revolves, carrying drive gear with it.
Automatic Cycle	**Tone Arm Rises**	1. Main cam and gear revolves with drive gear. 2. Stud on tone arm lever rides in top track on main cam and directs movement of the lever. 3. Tone arm elevating lever rides up on ridge on main cam and pushes tone arm up by means of elevating rod.
	Tone Arm Moves Out	1. Tone arm lever pushes on trip lever stud. 2. Trip lever moves out. 3. Stud on trip lever, on its outermost swing, pushes feed-in lever into latch lever (130) (fig. 3). 4. Tone arm return lever is carried along by trip lever stud, and by stud on main cam top track.
	Record Knife Separates Bottom Record from Stack After Gauging Thickness of Record	1. Stud on separator lever follows main cam bottom track and directs the motion of the lever. 2. Through the separator link and crank, the separator lever turns the separator shaft. 3. Knife turns with shaft and strikes edge of bottom record. 4. Separator shaft continues to revolve and teeth on inner circumference of knife ride up on shelf teeth until knife is carried high enough against the action of spring (112) (fig. 4) to move in over top of record.
	Record Drops to Turntable	1. Separator shaft continues to turn until knife supports stack of records and shelf moves out from under bottom record.
	Tone Arm Moves In	1. Separator shaft reverses rotation. 2. Tone arm lever moves away from trip lever stud. 3. While tone arm lever moves away from stud on trip lever, the retard lever, hinged on tone arm lever, stabilizes tone arm for accurate landing. 4. Tone arm return lever pushes on trip lever stud. 5. Trip lever moves in.
	Tone Arm Lowers Sapphire on to Record	1. Index finger on tone arm return lever moves against separator shaft to insure proper landing position. 2. Tone arm elevating lever rides down on main cam ridge thus lowering the elevating rod and the tone arm. 3. Separator shaft returns knife to original position and allows stack of records to rest on shelf.
	Sapphire Moves In to Record Groove **Record Begins to Play**	1. Ratchet lever rides into eccentric step on main gear shaft and blocks drive cam pawl. 2. Pawl is disengaged from drive cam sprocket. 3. Drive gear and main gear stop. 4. Tone arm lever moves into cam to maintain disengagement. 5. As tone arm lever moves to its innermost position, it contacts feed-in latch (130) (fig. 3), unlatching feed-in lever. This allows it to gently push pickup into the first groove of the record.
	Last Record Drops and the Last Selection Is Finished Playing	1. As the mechanism goes into cycle the separator shaft raises, allowing segment cam to engage index finger and prevent tone arm return lever from pushing tone arm in for landing. 2. Tone arm is lowered into rest position. 3. Power is removed from drive motor by the weight of the tone arm resting on stop button which opens the stop switch.

SERVICE HINTS

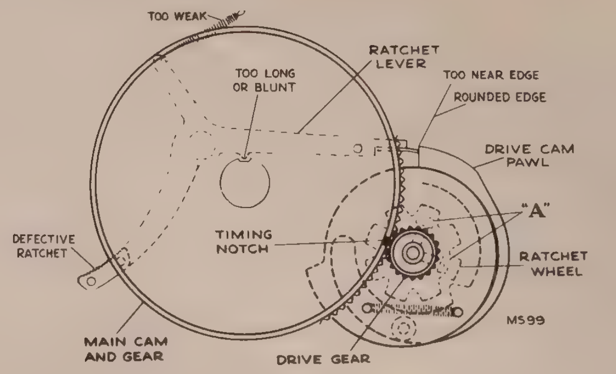
Fails to Trip:

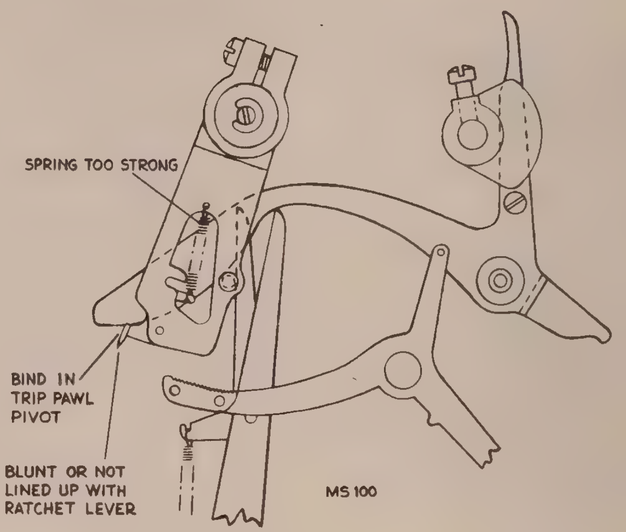

TOO STRONG
RATCHET LEVER
BINDS
ROUGH OR BURRED
BURRS
DRIVE CAM PAWL BINDS ON DRIVE CAM.
"A"
TIMING NOTCH
RATCHET WHEEL
LOOSE OR MISSING SPRING
MAIN CAM AND GEAR
DRIVE GEAR
BINDS
MS96


SPRING LOOSE OR MISSING
TRIP PAWL TOO BLUNT
BINDS
MS98

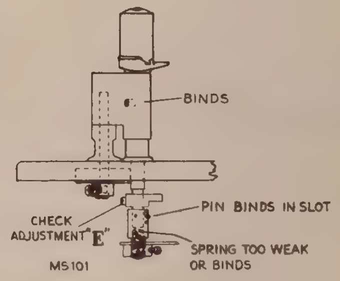

EXCESSIVE PLAY IN BEARING
LOOSE BOLT
SPRING TOO STRONG
BINDS,- METAL FILINGS OR GRIT IN BALL BEARINGS
STUD TOUCHING MOTOR BOARD. AT TURNTABLE RECESS
LOOSE SCREW
MS97

Trips Early:

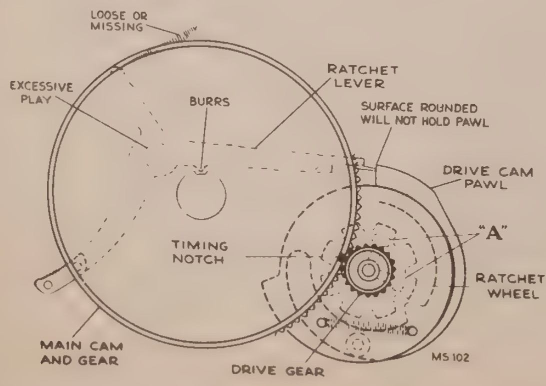

TOO WEAK
RATCHET LEVER
TOO LONG OR BLUNT
TOO NEAR EDGE
ROUNDED EDGE
DRIVE CAM PAWL
"A"
DEFECTIVE RATCHET
TIMING NOTCH
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS99

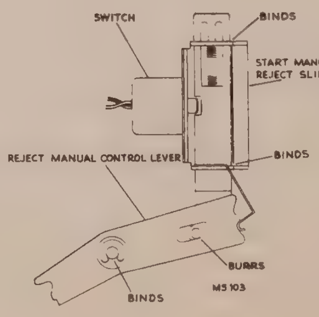

SPRING TOO STRONG
BIND IN TRIP PAWL PIVOT
BLUNT OR NOT LINED UP WITH RATCHET LEVER
MS 100

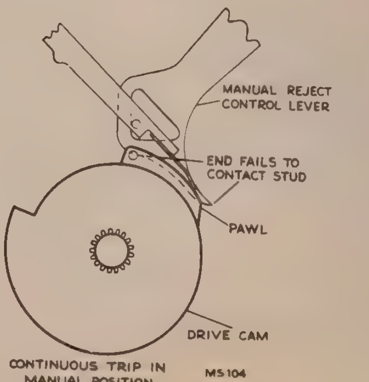
Repeats Playing of Last Record:


BINDS
PIN BINDS IN SLOT
CHECK ADJUSTMENT "E"
SPRING TOO WEAK OR BINDS
MS101

Trips Continuously:

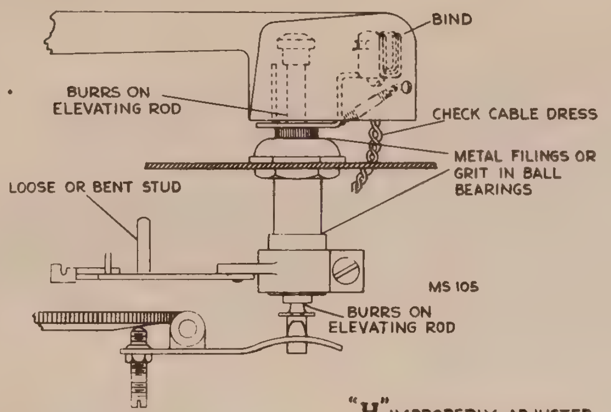

LOOSE OR MISSING
EXCESSIVE PLAY
BURRS
RATCHET LEVER
SURFACE ROUNDED WILL NOT HOLD PAWL
DRIVE CAM PAWL
"A"
TIMING NOTCH
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS 102


SWITCH
BINDS
START MANUAL REJECT SLIDE
REJECT MANUAL CONTROL LEVER
BINDS
BURRS
BINDS
MS 103

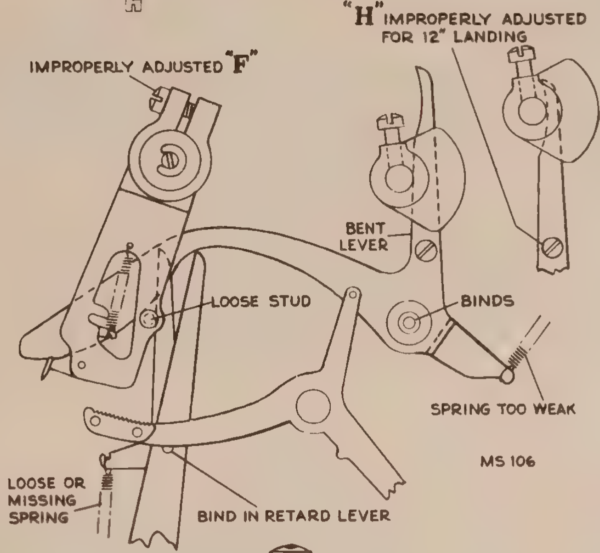

MANUAL REJECT CONTROL LEVER
END FAILS TO CONTACT STUD
PAWL
DRIVE CAM
MS 104

CONTINUOUS TRIP IN MANUAL POSITION

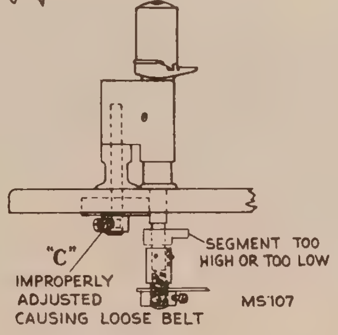
Lands Incorrectly:


BIND
BURRS ON ELEVATING ROD
CHECK CABLE DRESS
METAL FILINGS OR GRIT IN BALL BEARINGS
LOOSE OR BENT STUD
BURRS ON ELEVATING ROD

MS 105

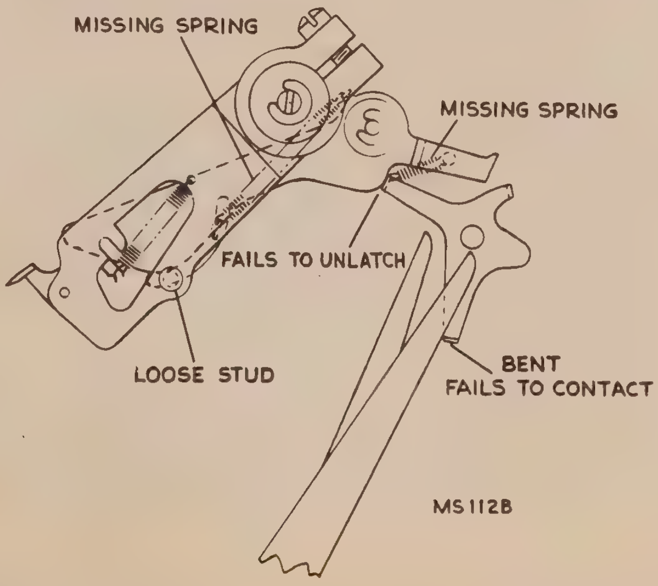

"H" IMPROPERLY ADJUSTED FOR 12" LANDING
IMPROPERLY ADJUSTED "F"
BENT LEVER
LOOSE STUD
BINDS
SPRING TOO WEAK
LOOSE OR MISSING SPRING
BIND IN RETARD LEVER

MS 106


"C" IMPROPERLY ADJUSTED CAUSING LOOSE BELT
SEGMENT TOO HIGH OR TOO LOW

MS 107

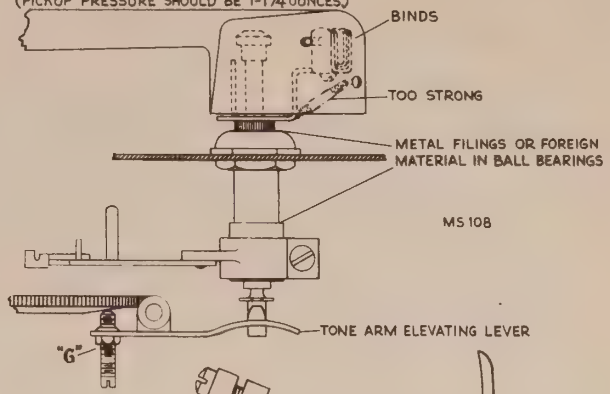
Incorrect Feed-in:


MISSING SPRING
MISSING SPRING
FAILS TO UNLATCH
LOOSE STUD
BENT
FAILS TO CONTACT

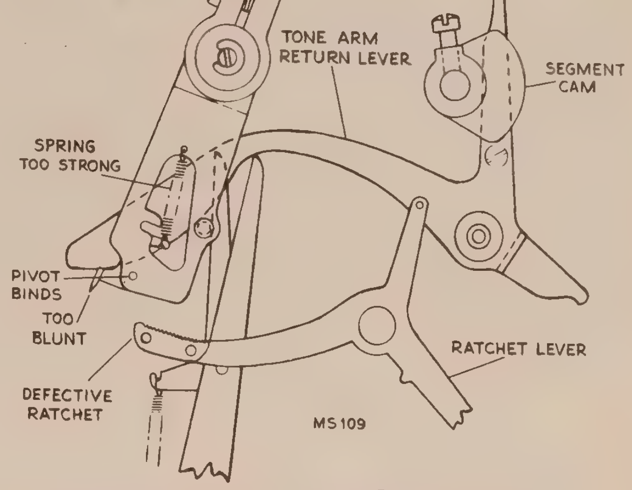
MS 112B

Repeats Grooves:

(PICKUP PRESSURE SHOULD BE 1-1¼ OUNCES)

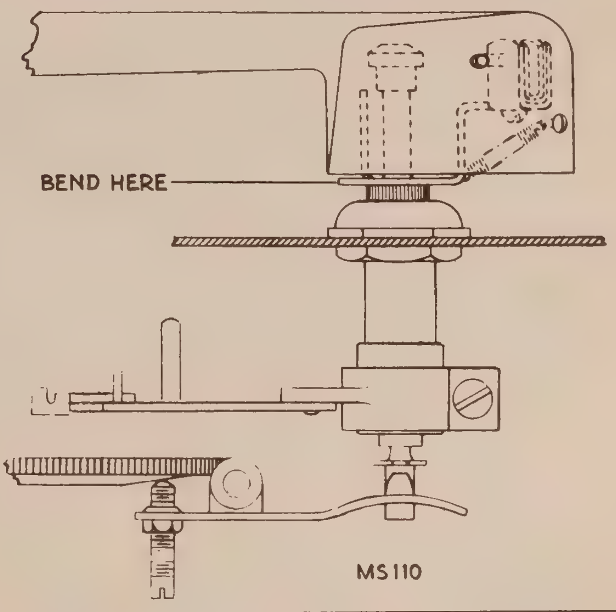

BINDS
TOO STRONG
METAL FILINGS OR FOREIGN MATERIAL IN BALL BEARINGS
"G"
TONE ARM ELEVATING LEVER

MS 108


TONE ARM RETURN LEVER
SEGMENT CAM
SPRING TOO STRONG
PIVOT BINDS
TOO BLUNT
DEFECTIVE RATCHET
RATCHET LEVER

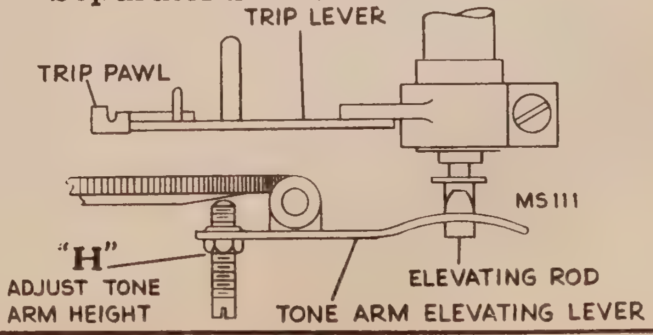
MS 109

Sapphire Strikes Motorboard:



MS 110

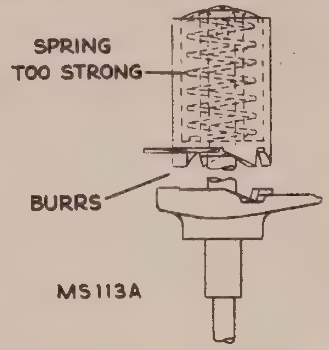
Tone Arm Touches Record on Separator Shelf:

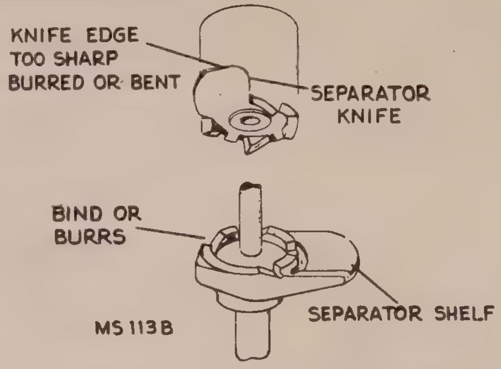

TRIP LEVER
TRIP PAWL
"H" ADJUST TONE ARM HEIGHT
ELEVATING ROD
TONE ARM ELEVATING LEVER

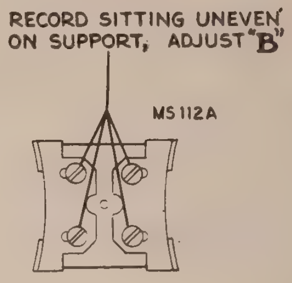
MS 111

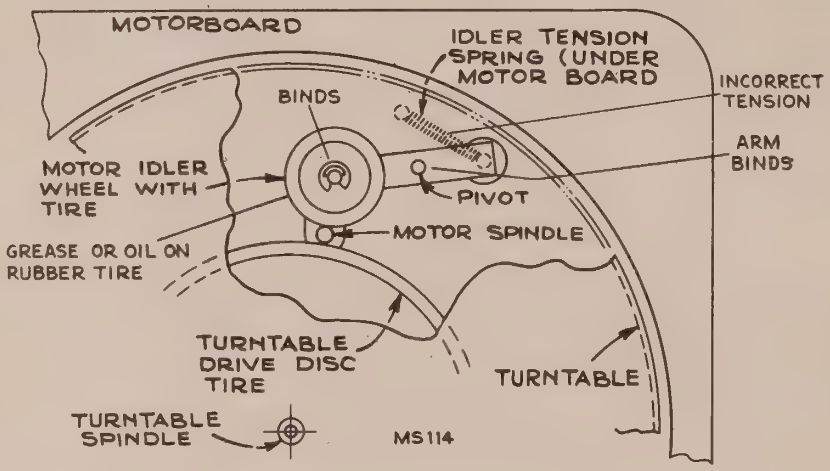
Records Jam or Stack Unsteady:

Record too thick, too thin, warped, or has rough edge.


SPRING TOO STRONG
BURRS
MS113A

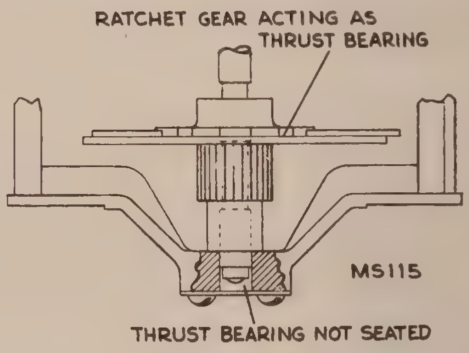

KNIFE EDGE TOO SHARP BURRED OR BENT
SEPARATOR KNIFE
BIND OR BURRS
SEPARATOR SHELF
MS113B


RECORD SITTING UNEVEN ON SUPPORT, ADJUST "B"
MS112A

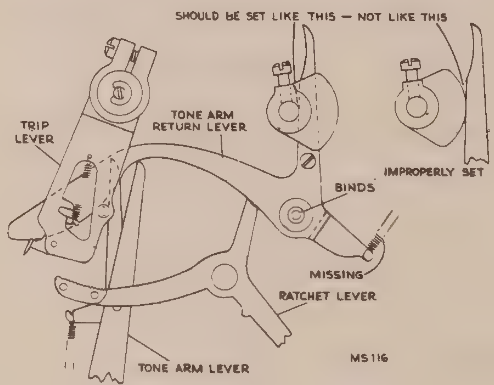

MOTORBOARD
IDLER TENSION SPRING (UNDER MOTOR BOARD
INCORRECT TENSION
BINDS
ARM BINDS
MOTOR IDLER WHEEL WITH TIRE
PIVOT
MOTOR SPINDLE
GREASE OR OIL ON RUBBER TIRE
TURNTABLE DRIVE DISC TIRE
TURNTABLE
TURNTABLE SPINDLE
MS114

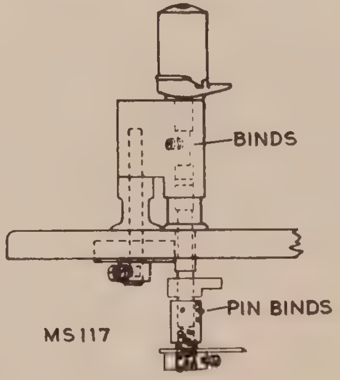
Slow Speed:

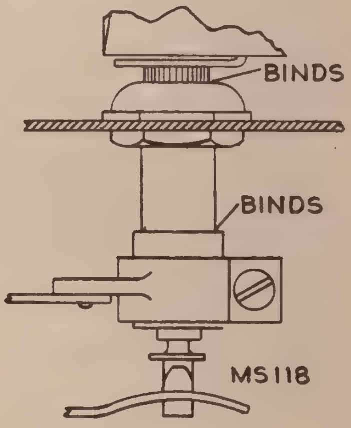
Turntable spindle binds on bottom or top bearing.


RATCHET GEAR ACTING AS THRUST BEARING
MS115
THRUST BEARING NOT SEATED

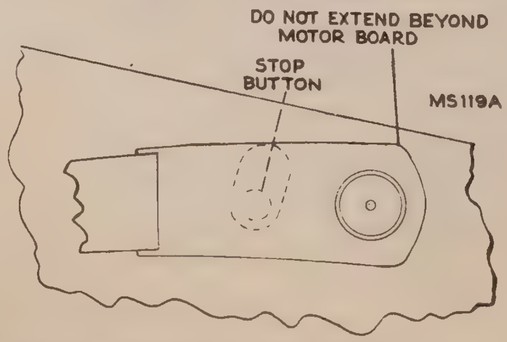
Tone Arm Continues to Come Down in Rest Position:


SHOULD BE SET LIKE THIS — NOT LIKE THIS
TRIP LEVER
TONE ARM RETURN LEVER
IMPROPERLY SET
BINDS
MISSING
RATCHET LEVER
TONE ARM LEVER
MS116

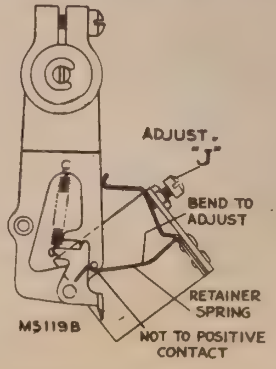

BINDS
PIN BINDS
MS117


BINDS
BINDS
MS118

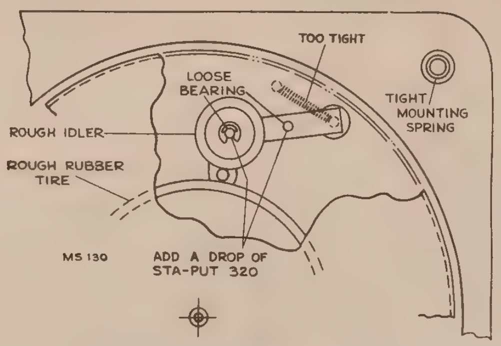
Tone Arm Lands Incorrectly on Rest, Drifts Off of Rest, or Jumps Suddenly When Moving in for Landing:

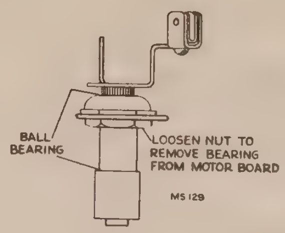

DO NOT EXTEND BEYOND MOTOR BOARD
STOP BUTTON
MS119A

1. Adjust "J" for tone arm limit stop.
2. Bend retainer spring which contacts stud on trip lever, so tone arm is stabilized while on rest or in the outermost position. Do not make too positive contact or motion of tone arm will start motion with a sudden jump.


ADJUST "J"
BEND TO ADJUST
RETAINER SPRING
NOT TO POSITIVE CONTACT
MS119B

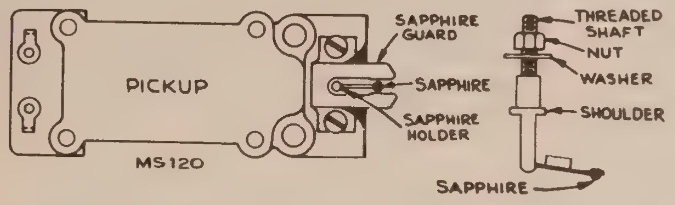
Rumble:


TOO TIGHT
LOOSE BEARING
TIGHT MOUNTING SPRING
ROUGH IDLER
ROUGH RUBBER TIRE
MS 130
ADD A DROP OF STA-PUT 320


BALL BEARING
LOOSEN NUT TO REMOVE BEARING FROM MOTOR BOARD
MS 129

Do not remove ball bearings from tone arm bearing unless absolutely necessary. If cleaning is necessary immerse entire bearing in cleaning solution such as carbon tetrachloride.

Replacement of Sapphire:


PICKUP
MS120
SAPPHIRE GUARD
SAPPHIRE
SAPPHIRE HOLDER
THREADED SHAFT
NUT
WASHER
SHOULDER
SAPPHIRE

Caution: Never bend the sapphire support wire.

Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the viscoloid until the sapphire holder assembly comes free.

Insert threaded shaft of replacement sapphire holder through viscoloid and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Note: Pickup force should be approximately 1 to 1¼ oz.

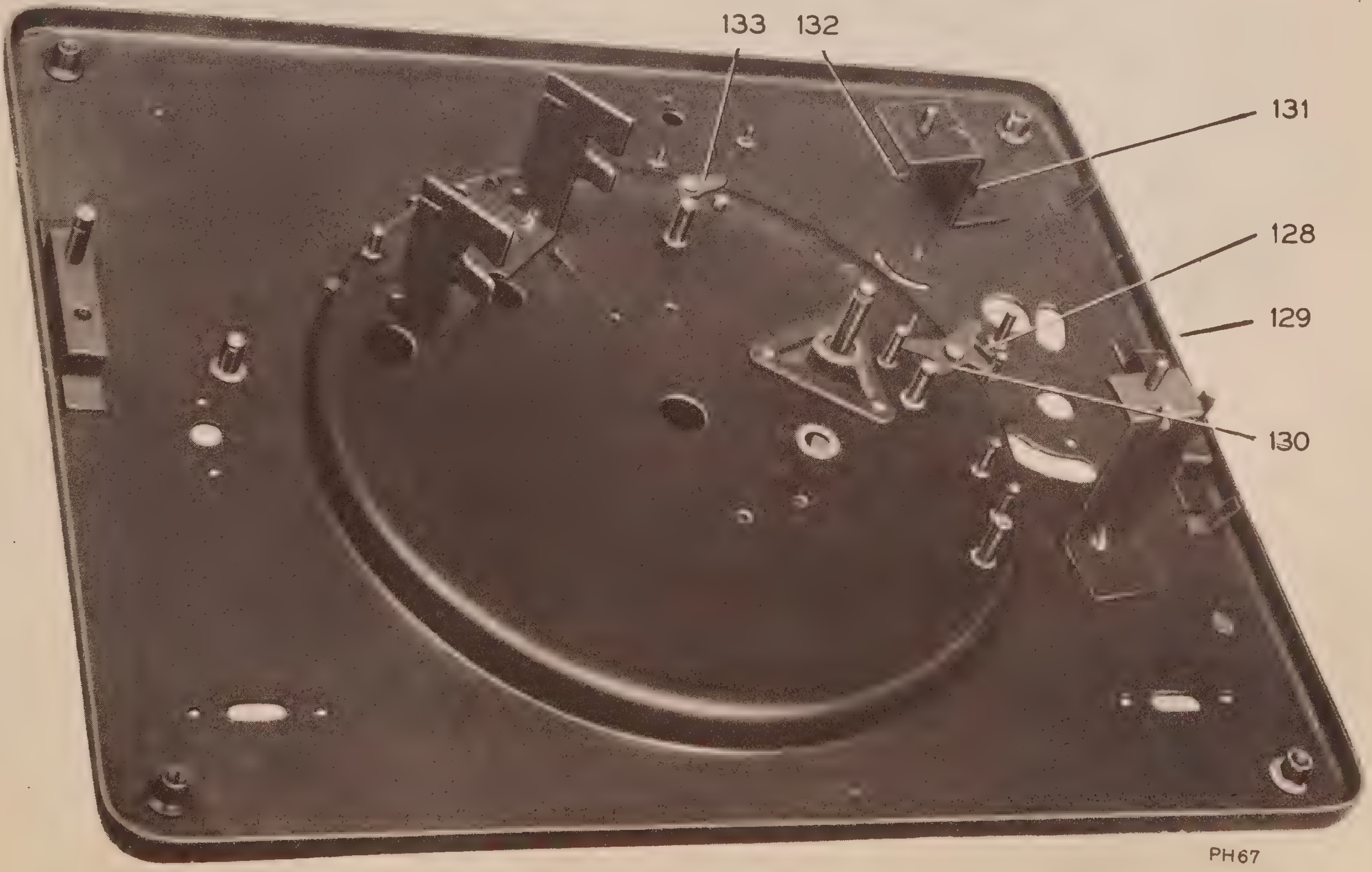
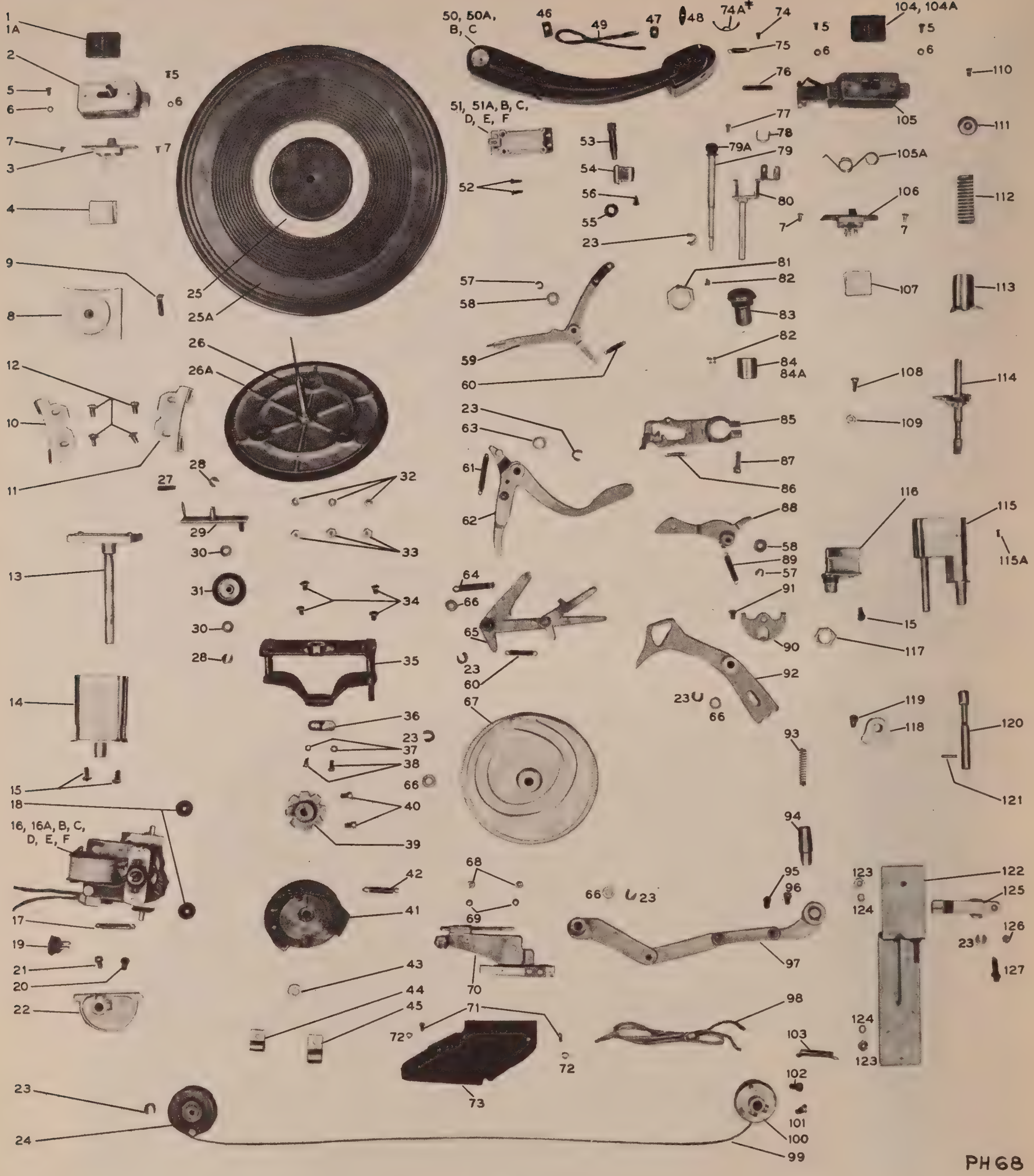

133
132
131
128
129
130
PH67

FIG. 3


1
1A
2
5
6
7
3
4
9
8
25
25A
26
26A
12
10
11
28
27
13
14
15
18
16, 16A, B, C,
D, E, F
17
19
21
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34
35
36
37
38
39
40
41
42
43
44
45
50, 50A,
B, C
46
49
47
48
74A‡
74
75
76
51, 51A, B, C,
D, E, F
52
53
54
56
55
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58
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79A
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84A
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102
103
104, 104A
105
105A
106
107
108
109
110
111
112
113
114
115
115A
116
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126
127
PH68

FIG. 4

Note: RP-176, 176A, 176B mechanisms are the same mechanically. The difference being in color of certain parts as indicated in parts list, Ref. Nos. 1, 14, 25, 50, 104, 115, 116, 129.

On later models, flat washers have been placed under the heads of each of the four #10 screws (Ref. No. 12) holding the record supports. This tends to prevent the supports from slipping when the screws are tightened after the adjustment has been made.

‡ Ref. No. 74A used in place of Ref. No. 74 on late production.

REPLACEMENT PARTS

REF. No.	STOCK No.	DESCRIPTION
1*	70946	Knob—"Off-On" knob (RP-176 & RP-176B)
1	72720	Knob—"Off-On" knob (RP-176A)
1A	14270	Spring—Retaining spring for knobs
2*	70874	Slider—"Off-On" action slider—less switch
3*	70875	Switch—"Off-On" switch
4*	71106	Cover—Metal cover for "Off-On" switch
5*	70881	Screw—#4-40 x ¼" binder head screw for slider controls
6†		Washer—Lockwasher split type #4
7†		Screw—Binding head screw, #4-40 x ¼" brass
8*	70857	Cap—Record support cap
9*	70882	Screw—#10-32 x ¾" oval head screw for record support cap
10*	70862	Support—Record support for 12" records only
11*	70860	Support—Record support for 10" records only
12*	70861	Screw—#10-32 x ⅜" binding head screw for record supports
13*	70859	Shelf—Record support shelf and shaft minus supports
14*	70888	Base—Record support base (RP-176)
14*	72561	Base—Record support base (RP-176A & RP-176B)
15†		Screw—Self-tapping screw, #10 x ⅜" long
16	38612	Motor—105-125 volts, 60 cycle (complete with mounting bracket)
16A	37108	Bearing—Bottom bearing and bracket
16B	37107	Bearing—Top bearing and bracket
16C	37109	Bracket—Motor mounting bracket
16D	37111	Coil—Motor field coil assembly
16E	37106	Pad—Rotor thrust pad
16F	37110	Rotor—Motor rotor complete with fan
17*	71545	Spring—Motor tension spring (.192" O.D. x 1½"—58 turns)
18	34368	Grommet—Rubber grommet to mount motor (2 required)
19	30870	Plug—2-prong male plug for power cable
20	39772	Screw—#10-32 x 5/16" fillister head cone point set screw for record support shaft cam
21*	32869	Screw—#10-32 x 5/16" fillister head screw for separator drum and record support shaft cam
22*	70845	Cam—Record support shaft cam—less mounting screws
23	2917	Washer—"C" washer for tone arm lever and for drum and belt assembly, tone arm return lever link and lever assembly, tone arm lever, main cam and manual lever and lift rod.
24*	70899	Drum—Record support belt drum
25*	70865	Turntable—Finished turntable plate (including mat) (RP-176 & RP-176B)
25*	72718	Turntable—Finished turntable plate (including mat) (RP-176A)
25A*	70866	Mat—Rubber mat for turntable
26*	70867	Spindle—Turntable spindle (including disc with rubber tire)
26A	37873	Tire—Rubber drive tire
27*	71546	Spring—Idler arm tension spring (.187" O.D. x ⅞"—31 turns)
28	33726	Washer—"C" washer for idler arm and wheel
29*	70863	Arm—Motor idler arm—less wheel
30	39996	Washer—Fibre washer for idler wheel (2 required)
31	36274	Wheel—Idler wheel
32†		Washer—Lockwasher (split type #6)
33†		Nut—6 x 32 brass
34†		Screw—Machine screw #8-32 x 3/16" long
35*	70891	Support—Turntable spindle support
36*	70880	Plate—Spring thrust plate for turntable spindle
37†		Washer—Lockwasher (split type #6)
38*	70883	Screw—#6-32 x 5/16" round head screw for turntable spring plate
39	38624	Ratchet—Ratchet wheel (drive cam sprocket) for turntable drive—less mounting screws
40	38626	Screw—#8-32 x ¼" fillister head set screw for ratchet wheel
41*	70853	Cam—Drive shaft cam and pawl—less tension spring
42*	70854	Spring—Drive shaft cam and pawl spring (.195" O.D. x 1-3/16"—42 turns)
43*	70879	Washer—Washer for cam and pawl
44†		Clamp—Metal clamp fastening pickup leads to bracket 122
45†		Clamp—Metal clamp fastening power and motor leads to cover 73
46	38458	Nut—Speed nut to hold cable—located in front of arm
47*	71095	Nut—Speed nut to hold cable—located in rear of arm
48*	71279	Nut—Speed nut to hold cable—located in rear of pivot arm
49*	71278	Cable—Pickup cable (twisted pair)
50*	70901	Arm—Tone arm complete, including reflector cap, crystalite button, and reflector—less pivot arm, crystal and cable (RP-176 & RP-176B)
50*	72716	Arm—Pickup arm complete, including reflector cap, crystalite button, and reflector—less pivot arm, crystal and cable (RP-176A)
50A*	70903	Button—Crystalite button (part of tone arm)
50B*	70904	Cap—Reflector cap—lucite (part of tone arm)
50C*	70902	Reflector—Reflector (part of tone arm)
51*	70339	Crystal—Pickup crystal (complete)
51A	70019	Damper—Viscoloid damper—top front
51B*	70914	Damper—Viscoloid damper for sapphire
51C	38452	Guard—Sapphire guard
51D	70341	Nut—Mounting washer and nut for sapphire
51E*	70915	Sapphire—Sapphire and holder assembly
51F	37763	Screw—#2-56 x ⅛" screw for sapphire guard
52*	70912	Screw—#4-40 x ⅜" binder head screw to mount crystal (2 required)
53*	71102	Button—Pickup stop switch button
54*	70889	Rest—Pickup arm rest
55	32943	Nut—Pickup stop switch button speed nut
56†		Screw—Self-tapping screw, #10 x ⅜" long
57	20165	Washer—"C" washer for ratchet lever and feed-in lever
58†		Washer—Steel washer, O.D. .½", I.D. .193", T-.020"
59*	70851	Lever—Ratchet lever assembly
60*	71549	Spring—Ratchet lever spring (.180" O.D. x ⅞"—54½ turns) and tone arm lever spring
61*	71726	Spring—Tone arm return lever spring (.218" O.D. x 1½"—48½ turns)
62*	70847	Lever—Tone arm return lever
63*	70884	Washer—Bearing washer for tone arm return lever
64*	71547	Spring—Tone arm lever tension spring (.218" O.D. x 1½"—48½ turns)
65*	70858	Lever—Tone arm lever
66*	70877	Washer—.280" I.D. x 7/16" flat washer for tone arm lever, main cam, manual lever and separator link
67*	70864	Cam—Main cam
68†		Nut—Hex. nut 6-32
69†		Washer—Lockwasher (split type #6)
70*	70876	Switch—Pickup muting switch (including stop switch and bracket)
71†		Screw—Round head brass screw, #4-40 x 3/16" long
72†		Washer—Lockwasher (split type #4)
73*	70855	Cover—Stop switch cover
‡74*	70913	Stud—Pivot arm spring stud
75*	71099	Spring—Pivot arm spring (.187" O.D. x ¾"—24 turns)
76*	70905	Pin—Pivot pin
77*	71097	Screw—#4-¼" long self-tapping screw to lock pivot clamps
78*	71098	Clamp—"U" clamp to lock pivot arm in position
79*	70909	Rod—Pusher rod (including rubber cushion)
79A	38607	Cushion—Rubber cushion for pusher rod
80*	70906	Arm—Pivot arm and shaft
81*	70886	Nut—¾-32 hex nut for pickup arm
82	3658	Ball—Steel ball (3/32" dia.)
83*	70910	Bushing—Pivot arm bushing (upper)
84*	70911	Bushing—Pivot arm bushing (lower)
84A	5042	Screw—#8-32 x ⅛" set screw for lower pivot arm bushing
85*	70856	Lever—Trip lever (including trip pawl and trip pawl spring)
86*	71543	Spring—Trip spring (.135" O.D. x 21/32"—58 turns)
87†		Screw—Fil. head machine screw, #10-32 x ⅝" steel
88*	70873	Lever—Feed-in lever
89*	71550	Spring—Feed-in lever adjusting disc spring (.160" O.D. x 1¼"—75 turns)
90*	70885	Disc—Feed-in adjusting disc
91†		Screw—Binding head, #8-32 x ¼" long
92*	70869	Lever—Manual reject lever
93*	70850	Spring—Record separator shaft bottom spring (.290" O.D. x 1.35"—14¾ turns)
94*	70849	Bushing—Record separator shaft bushing
95*	71100	Screw—#10-32 x ¼" round head screw for link
96	31118	Screw—#10-32 x 5/16" fillister head set screw for link
97*	70852	Link—Record separator shaft link and lever
98*	71105	Cable—Shielded pickup cable complete with plug
99*	70900	Belt—Record separator to support belt—minus drum
100*	70898	Drum—Record separator drum
101	32869	Screw—#10-32 x 5/16" fillister head screw for separator drum and record support shaft cam
102	72562	Screw—#10-32 x ⅜" fillister head set screw for separator drum
103*	71544	Spring—Drum and belt tension spring (.255" O.D. x 1⅜"—27½ turns)
104*	70870	Knob—"Start-Reject-Automatic-Manual" knob (RP-176 & RP-176B)
104*	72719	Knob—"Start-Reject-Manual" knob (RP-176A)
104A		Same as 1A
105*	70871	Slider—Reject action slider—less switch and spring
105A†	72515	Spring—Used in slider assembly (70871)
106*	70875	Switch—"Start-Reject-Automatic-Manual" switch
107*	71107	Cover—Metal cover for "Start-Reject-Manual-Automatic" switch
108†		Screw—Round head mach. screw, #8-32 x 7/16" brass
109†		Nut—Hex nut, #8-32 brass
110*	70893	Screw—#6-32 x ¼" oval head screw for record separator cap
111*	70897	Cap—Record separator cap
112*	70895	Spring—Record separator spring—upper (.622" O.D. x 1-11/16"—13½ turns)

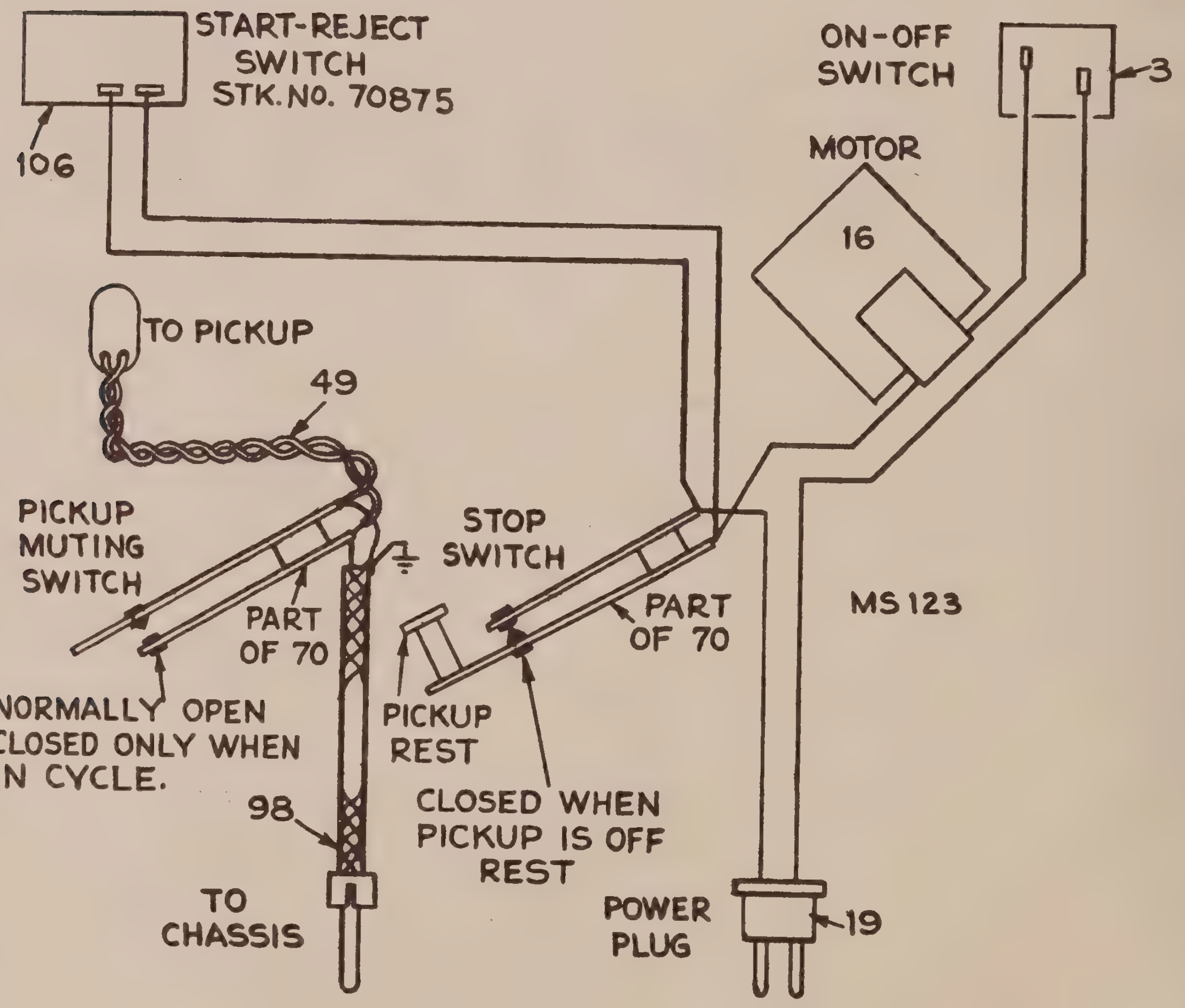
‡ **Ref. No. 74A, Stock No. 73198 curved spring for anchoring pivot arm spring (late prod. only).**

REPLACEMENT PARTS (Continued)

REF. No.	STOCK No.	DESCRIPTION
113	70894	Knife—Record separator knife
114	70896	Shelf—Record separator shelf and shaft
115	70846	Swivel—Record separator swivel and shaft (RP-176)
115	72559	Swivel—Record separator swivel and shaft (RP-176A & RP-176B)
116	72560	Support—Record separator support (RP-176A & RP-176B)
116	70887	Support—Record separator support (RP-176)
117	70890	Nut—#9-16/32 hex nut for separator support
118	70848	Cam—Shut-off or segment cam—fastens on record separator shaft
119	70878	Screw—#10-32 x 5/16" round head screw for shut-off cam assembly
120	71280	Shaft—Record separator bottom shaft
121	71103	Pin—Drive pin for record separator shaft end bushing
122	70868	Brace—Angle bracket or bottom support for tone arm elevating lever
123†		Nut—Hex nut #10-32
124†		Washer—Lockwasher, #10 split type
125	38631	Lever—Tone arm elevating lever
126	71104	Nut—#10-32 hex locknut for tone arm lever adjustment
127	39691	Screw—#10-32 x 7/8" headless screw for adjusting tone arm lift lever
128	71548	Spring—Feed-in control spring (.160" O.D. x 11/16"—52 turns)
129	70844	Board—Motorboard sub-assembly complete with all welded and riveted parts—less detachable operating parts (Fig. 3) (RP-176 & RP-176B)
129	72717	Board—Motorboard sub-assembly complete with all welded and riveted parts—less detachable operating parts (RP-176A)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

† These parts are not stocked.


START-REJECT
SWITCH
STK. NO. 70875
106
ON-OFF
SWITCH
3
MOTOR
16
TO PICKUP
49
PICKUP
MUTING
SWITCH
PART
OF 70
NORMALLY OPEN
CLOSED ONLY WHEN
IN CYCLE.
STOP
SWITCH
PART
OF 70
PICKUP
REST
CLOSED WHEN
PICKUP IS OFF
REST
MS 123
98
TO
CHASSIS
POWER
PLUG
19

RCA VICTOR

RP 177

Automatic Record Changer

SERVICE DATA

—1947 No. 5—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

FEATURES

1. This record changer is a two-support, drop type, non-intermixing mechanism designed to play automatically a series of twelve ten-inch or ten twelve-inch records of the standard 78 RPM type.
2. The mechanism uses a lightweight, low-noise, crystal pickup cartridge, equipped with a long-life sapphire point.
3. The tone arm is automatically returned to rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric tripping device which insures tripping on all standard records.
5. A pickup muting switch is incorporated, which shorts out the pickup while the changer is in cycle. This prevents mechanical noise of moving parts from being amplified.
6. The record support and separator are mechanically linked, requiring only one operation for changing of record size.
7. Moving parts are few in number while playing records. This insures quiet reproduction, free from rumble and wow.
8. The mechanism is provided with a safety clutch which prevents damage to the mechanism in case of a jam due to a defective record.
9. The accessible feed-in adjustment is positive in action.

MANUAL OPERATION

1. Make certain the mechanism is out of cycle with the pickup on the rest.
2. Push "Start-Reject" knob to manual position.
3. Place record on turntable and push the power switch to the "on" position.
4. Lift and place pickup on record.
5. When the selection has finished playing, the pickup will continue to ride in the eccentric groove until the pickup is lifted from the record or the power is removed from the drive motor.

LUBRICATION

A light machine oil (SAE #10) should be used to oil the bearings of the drive motor.

On all bearing surfaces, excepting the motor bearings, Houghton STA-PUT No. 320, or equivalent, should be used. On all other surfaces, STA-PUT No. 512, or equivalent, is recommended. STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa.

(Do not oil or grease record separator shaft.)

It is important that the drive motor spindle and the rubber tire on the friction disc as well as that on the idler wheel be kept clean and free from oil or grease, dirt, or any foreign material at all times. Carbon tetrachloride or naphtha is satisfactory for cleaning these parts.

AUTOMATIC OPERATION

The pickup "rest" consists of a post incorporating a button and shaft connecting a switch beneath the motor board. This switch, which controls the power to the drive motor, is actuated by the weight of the pickup and tone arm while going in and out of rest position.

1. Turn the record support on the left-hand side of the changer, to position it for 10- or 12-inch records.
2. Load the records on the supports with the desired selections upward, the last record to be played on top. (Make certain the separator shelf is pushed down when stack is placed on the supports.)
3. Push the "On-Off" knob to the "on" position.
4. Push "Manual-Reject" handle to reject position and release. The mechanism will automatically play in sequence, one side of each record stacked on the supports. After completing the selection on the last record the tone arm will return to rest position and the power will be removed from drive motor.
5. To reject a record being played, push the control handle to "Reject" and release.
6. Lift and turn separator shelf to facilitate the removal of records.
   (Note: For automatic operation, each record is required to have the standard eccentric groove.)

Cautions

Before servicing the automatic changer, inspect the assembly to see that all gears, cams, springs, levers, etc., are correctly assembled and in good working order.

1. Never use force to start or stop the motor or any part of the record changing mechanism.
2. Warped or damaged records may cause the mechanism to jam. When jamming occurs, the safety clutch slips, causing a clicking sound.
3. A cracked or chipped record may damage the sapphire.
4. Warped records may slide on one another while playing and result in unsatisfactory reproduction.
5. Do not leave the records on the record posts or on the turntable as they may warp, particularly in warm climates. Most warped records may be flattened by placing them on a flat surface with a heavy flat article placed on top of them for a few days.
6. If, for any reason, the mechanism stalls, turn off the "On-Off" switch and remove the records from the posts. Start the turntable by turning the switch on and allow the tone arm to complete its cycle.
7. Do not tighten copper-plated, cone-pointed screws until final adjustment has been made.

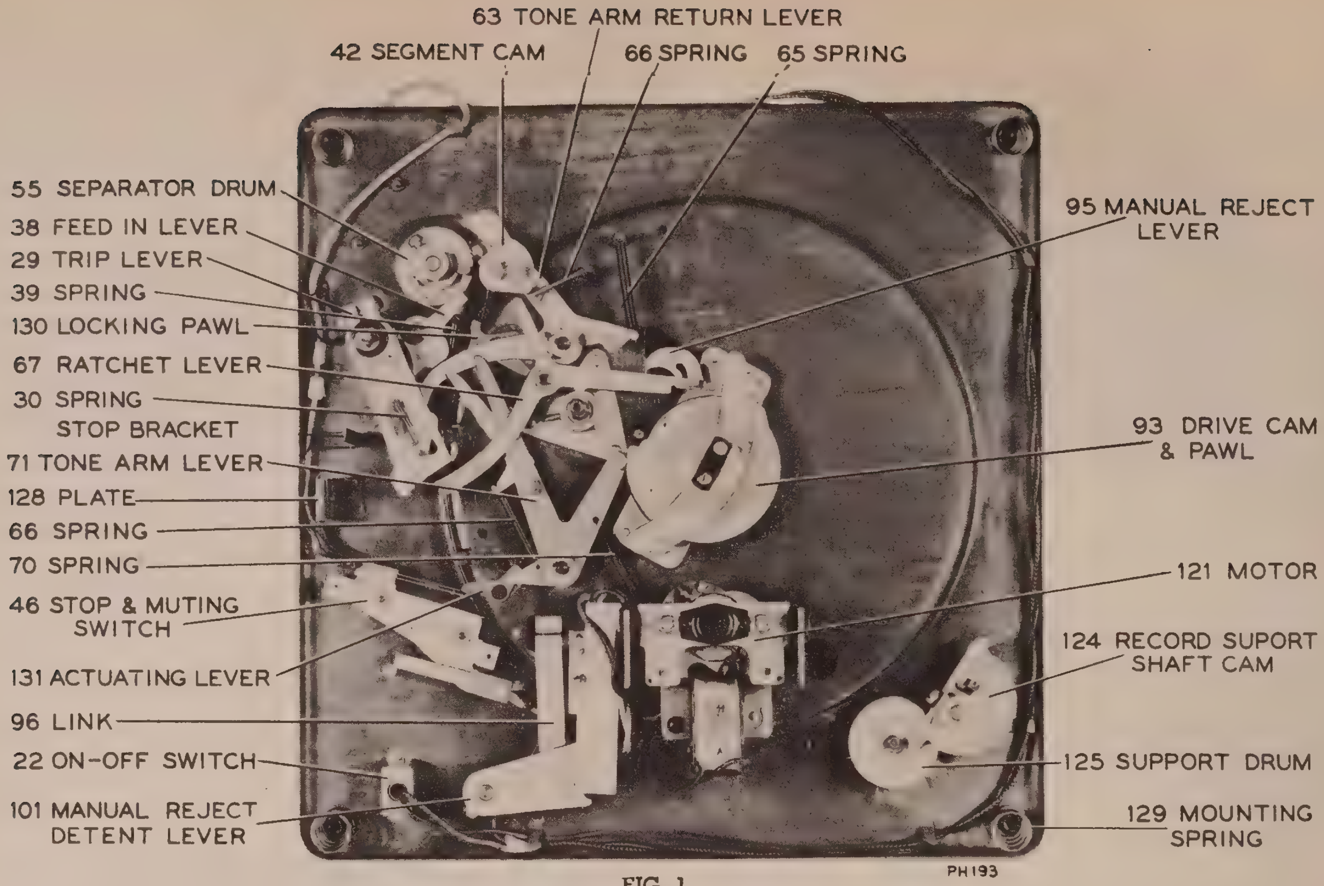

63 TONE ARM RETURN LEVER
42 SEGMENT CAM
66 SPRING
65 SPRING
55 SEPARATOR DRUM
38 FEED IN LEVER
29 TRIP LEVER
39 SPRING
130 LOCKING PAWL
67 RATCHET LEVER
30 SPRING
STOP BRACKET
71 TONE ARM LEVER
128 PLATE
66 SPRING
70 SPRING
46 STOP & MUTING SWITCH
131 ACTUATING LEVER
96 LINK
22 ON-OFF SWITCH
101 MANUAL REJECT DETENT LEVER
95 MANUAL REJECT LEVER
93 DRIVE CAM & PAWL
121 MOTOR
124 RECORD SUPORT SHAFT CAM
125 SUPPORT DRUM
129 MOUNTING SPRING
PH193

FIG. 1

FUNCTION OF PRINCIPAL PARTS

Trip Lever 29

When the pickup is riding in the eccentric groove, the trip pawl located on the trip lever engages the ratchet lever, starting the cycle.

Ratchet Lever 67

Portion of lever acts as a ratchet and the other portion acts as a stop or catch to hold the drive clutch from engaging.

Ratchet Wheel 90 (Fig. 4)

Acts as part of the safety clutch, which is engaged with the cam pawl during cycle.

Drive Cam, Gear and Pawl 93

Transfers motion from turntable through clutch to main gear.

Turntable Spindle Support 82 (Fig. 4)

Forms a bearing for turntable spindle.

Main Cam 80 (Fig. 4)

Has a series of tracks controlling cycling action.

Record Separator Lever, Link, Crank 85 (Fig. 4)

Transfers motion from the main cam through the stud, lever and link to the separator post during change cycle.

Feed-in Lever Locking Pawl or Latch 130

Provides a means of locking feed-in lever until the pickup has landed on the record, then unlatching and allowing feed-in lever to gently push the pickup into starting groove.

Manual-Reject Control Knob and Lever Assembly 102-101-96-95

In "manual" position, it contacts the stud on clutch portion of drive cam thereby preventing the clutch from engaging and starting cycle.

In "automatic" position, it permits operation of the ratchet lever safety clutch and stop switch.

In "start reject" position, it momentarily closes control switch which is shunted across stop switch. It also moves the ratchet lever away from drive cam pawl, permitting the clutch to engage and start cycle.

Muting Switch Actuating Lever 131

Opens pickup muting switch during the playing cycle.

Tone Arm Lever 71

Directs horizontal motion of tone arm. It also incorporates an additional retard lever which stabilizes tone arm while the mechanism is in cycle.

Tone Arm Return Lever 63

Moves the tone arm inward and provides positioning for landing.

Feed-in Lever 38

A small lever under spring tension providing a small amount of force inward on tone arm, after the pickup has landed on record.

Tone Arm Elevating Lever 77

Directs vertical motion of tone arm.

Tone Arm Elevating Rod 9 (Fig. 4)

Transfers motion from elevating lever to tone arm.

Record Support Shaft, Cam 124

Functions as a lock for record support belt drum.

Record Support and Separator Drums and Belt Assembly 55-56-125

Forms a mechanical linkage between record support and record separator.

Record Support

Provides a support for the record stack and a handle for record size change.

Record Separator Post and Blade

Functions to support the records and, together with the selector blade, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

Shut-off or Segment Cam 42

Forms a stop for tone arm return lever thereby preventing it from pushing the tone arm in for landing.

Retainer Spring and Plate 128

A small piece of phosphor-bronze functioning as a partial lock which stabilizes the tone arm when in the outermost position.

Stop Bracket (part of Motor Board)

A small piece of spring steel used as a stop, which determines the outermost position of tone arm. (Adjustable.)

Cycle of Operation

The changer can be conveniently rotated through the change cycle by pushing the reject handle and revolving the turntable by hand. Eight turntable revolutions are required for one change cycle. Block up the motor, so it is disengaged from the drive disc, to permit easier manual rotation of the turntable.

	Function	Explanation
Operator	Turn Record Support to 10" or 12" Position as Desired	1. Separator post positions itself by means of belt drive.
	Place Records on Posts	1. Separator shaft is pushed down against its spring and carries segment-cam out of path of index finger.
	Push Start Knob	1. Switch connected to start knob momentarily applies power to drive motor until tone arm is raised from stop button. 2. Manual-reject lever pushes ratchet lever. 3. Ratchet lever is pushed out of step on main gear shaft and releases drive cam pawl. 4. Drive cam pawl engages cam sprocket and it revolves, carrying drive gear with it.
Automatic Cycle	Tone Arm Rises	1. Main cam and gear revolves with drive gear. 2. Stud on tone arm lever rides in top track on main cam and directs movement of the lever. 3. Tone arm elevating lever rides up on ridge on main cam and pushes tone arm up by means of elevating rod.
	Tone Arm Moves Out	1. Tone arm lever pushes on trip lever stud. 2. Trip lever moves out. 3. Stud on trip lever, on its outermost swing, pushes feed-in lever into locking pawl (130) (fig. 1). 4. Tone arm return lever is carried along by trip lever stud, and by stud on main cam top track.
	Record Knife Separates Bottom Record from Stack After Gauging Thickness of Record	1. Stud on separator lever follows main cam bottom track and directs the motion of the lever. 2. Through the separator link and crank, the separator lever turns the separator shaft. 3. Knife turns with shaft and strikes edge of bottom record. 4. Separator shaft continues to revolve and teeth on inner circumference of knife ride up on shelf teeth until knife is carried high enough against the action of the coil spring to move in over top of record.
	Record Drops to Turntable	1. Separator shaft continues to turn until knife supports stack of records and shelf moves out from under bottom record.
	Tone Arm Moves In	1. Separator shaft reverses rotation. 2. Tone arm lever moves away from trip lever stud. 3. While tone arm lever moves away from stud on trip lever, the retard lever, hinged on tone arm lever, stabilizes tone arm for accurate landing. 4. Tone arm return lever pushes on trip lever stud. 5. Trip lever moves in.
	Tone Arm Lowers Sapphire on to Record	1. Index finger on tone arm return lever moves against separator shaft to insure proper landing position. 2. Tone arm elevating lever rides down on main cam ridge thus lowering the elevating rod and the tone arm. 3. Separator shaft returns knife to original position and allows stack of records to rest on shelf.
	Sapphire Moves In to Record Groove Record Begins to Play	1. Ratchet lever rides into eccentric step on main gear shaft and blocks drive cam pawl. 2. Pawl is disengaged from drive cam sprocket. 3. Drive gear and main gear stop. 4. Tone arm lever moves into cam to maintain disengagement. 5. As tone arm lever moves to its innermost position, it contacts feed-in latch, unlatching feed-in lever. This allows it to gently push pickup into the first groove of the record.
	Last Record Drops and the Last Selection Is Finished Playing	1. As the mechanism goes into cycle the separator shaft raises, allowing segment cam to engage index finger and prevent tone arm return lever from pushing tone arm in for landing. 2. Tone arm is lowered into rest position. 3. Power is removed from drive motor by the weight of the tone arm resting on stop button which opens the stop switch.

Preliminary Adjustments for Assembling Mechanism

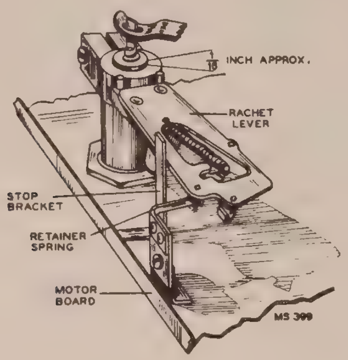
See page 6 for final adjustments.

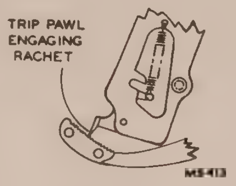
It should be understood that the preliminary adjustments are only approximate and intended to aid in the process of assembling a mechanism in which the major parts have been removed. The final and exact adjustments can be made when the mechanism is completely assembled.

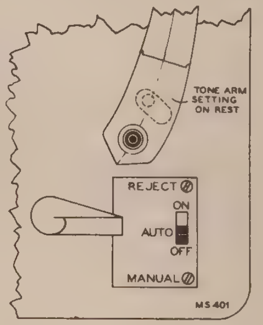
Mounting the Tone Arm:

The assembled tone arm should be mounted with the ratchet lever clamp approximately 1/16" from the end of the pivot arm bushing and against the stop bracket when the tone arm is on the rest as shown in the sketch.

(**Note:** The 1/16" is only a starting point, the important factor is to have the trip pawl engage the ratchet properly.)


1/16 INCH APPROX.
RACHET LEVER
STOP BRACKET
RETAINER SPRING
MOTOR BOARD
MS 399

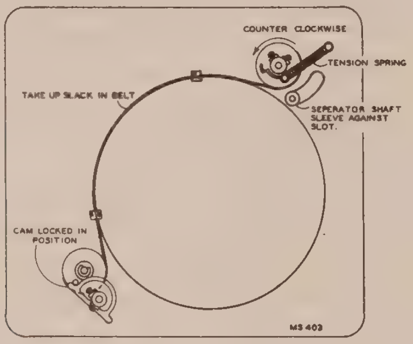

TRIP PAWL ENGAGING RACHET
MS 413

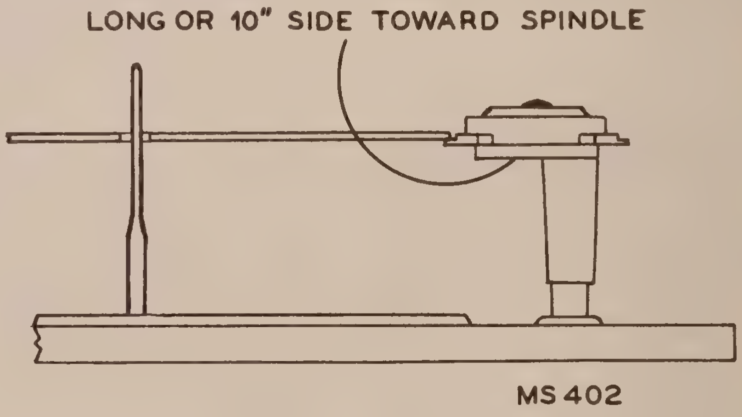

TONE ARM SETTING ON REST
REJECT
ON
AUTO
OFF
MANUAL
MS 401

Positioning Record Support Shaft:

Assemble the record support post with the ten inch side (long side) pointing towards the spindle. Adjust the cam so it is locked in position as shown in the sketch.

Take up all the slack in the belt by turning the separation shaft counter clockwise (viewed from underside) aiding the action of the tension spring when the separator shaft sleeve is against the side of the slot in the motor board nearest the turntable as shown in the sketch.

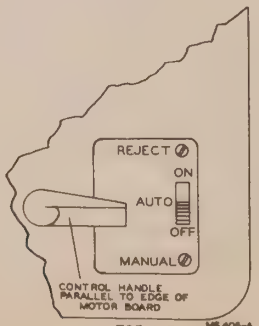

COUNTER CLOCKWISE
TENSION SPRING
TAKE UP SLACK IN BELT
SEPERATOR SHAFT SLEEVE AGAINST SLOT.
CAM LOCKED IN POSITION
MS 403


LONG OR 10" SIDE TOWARD SPINDLE
MS 402

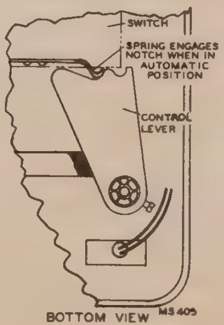
Manual-Reject Lever Mounting:

Place the control handle parallel to the front side of the motor board and pointing towards the "on-off" switch.

Adjust the control lever so the notch engages the spring of the switch as shown in the sketch when the control handle is in the automatic position.


REJECT
ON
AUTO
OFF
MANUAL
CONTROL HANDLE PARALLEL TO EDGE OF MOTOR BOARD
MS 405-A

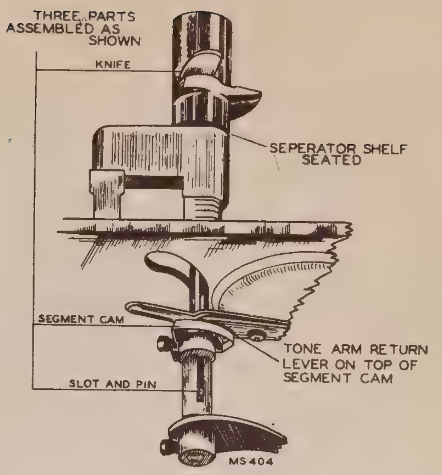
TOP VIEW

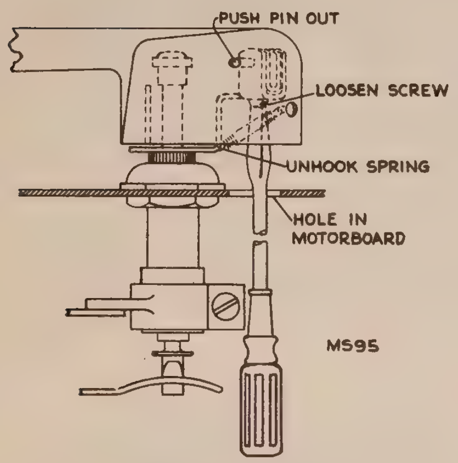

SWITCH
SPRING ENGAGES NOTCH WHEN IN AUTOMATIC POSITION
CONTROL LEVER
MS 405

BOTTOM VIEW

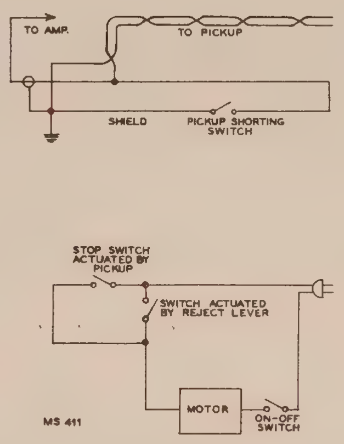
Mounting the Separator Knife and "Shut-off" Cam Assembly:

Turn the record support post to the ten inch position and assemble the separator knife, "Shut-off" cam, and separator shaft pin and bushing assembly approximately in line as shown in sketch. Allow the end of the tone arm return lever to ride on the upper side (towards the motor board) of the "shut-off" cam as shown in sketch.

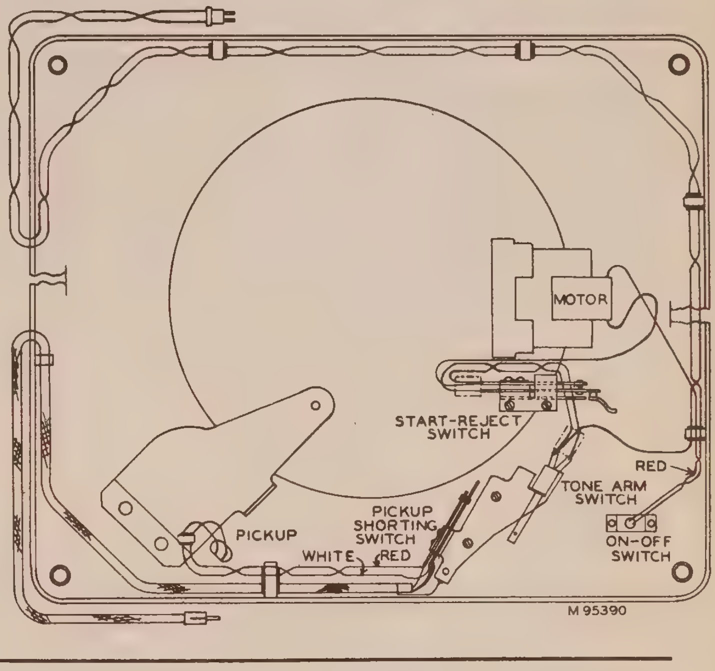

THREE PARTS ASSEMBLED AS SHOWN
KNIFE
SEPERATOR SHELF SEATED
SEGMENT CAM
TONE ARM RETURN LEVER ON TOP OF SEGMENT CAM
SLOT AND PIN
MS 404

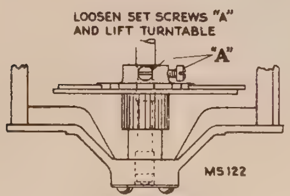

PUSH PIN OUT
LOOSEN SCREW
UNHOOK SPRING
HOLE IN MOTORBOARD
MS95

REMOVING TONE ARM


TO AMP.
TO PICKUP
SHIELD
PICKUP SHORTING SWITCH
STOP SWITCH ACTUATED BY PICKUP
SWITCH ACTUATED BY REJECT LEVER
MOTOR
ON-OFF SWITCH
MS 411

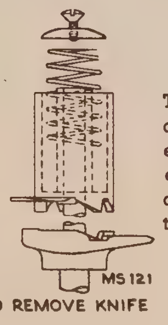
Electrical Connections


MOTOR
START-REJECT SWITCH
RED
TONE ARM SWITCH
PICKUP
PICKUP SHORTING SWITCH
WHITE
RED
ON-OFF SWITCH
M 95390


LOOSEN SET SCREWS "A" AND LIFT TURNTABLE
"A"
MS122

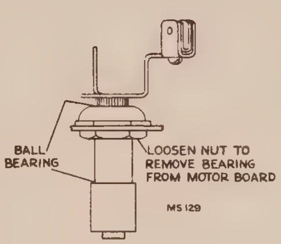
TO REMOVE TURNTABLE

To remove turntable loosen set screws "A" and lift the turntable.



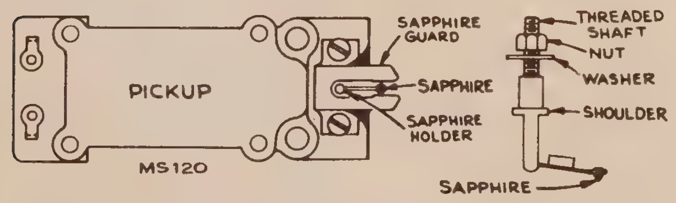
TO REMOVE KNIFE

To remove separator knife, loosen top screw and entire assembly can be dismantled as shown.


BALL BEARING
LOOSEN NUT TO REMOVE BEARING FROM MOTOR BOARD
MS 129

Do not remove ball bearings from tone arm bearing unless absolutely necessary. If cleaning is necessary immerse entire bearing in cleaning solution such as carbon tetrachloride.

Replacement of Sapphire:


PICKUP
MS120
SAPPHIRE GUARD
SAPPHIRE
SAPPHIRE HOLDER
THREADED SHAFT
NUT
WASHER
SHOULDER
SAPPHIRE

Caution: Never bend the sapphire support wire.

Extreme care should be used when loosening the sapphire mounting nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the viscoloid until the sapphire holder assembly comes free.

Insert threaded shaft of replacement sapphire holder through viscoloid and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Note: Pickup force should be approximately 1 to 1¼ oz.

Timing Notch on Main Cam and Gear:

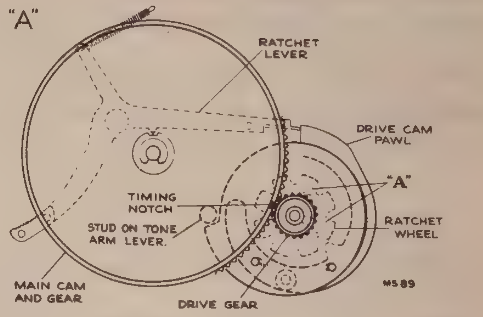
The timing notch originally in the rim of the main cam and gear is no longer used, instead a small metal projection has been added to the inside of the rim of the main cam and gear for the same purpose.

Reference Chart for Automatic Record Changer Adjustments

Mechanism jams. General irregularity of operation.

(Mechanism Timing)

With the ratchet lever and the pawl on the drive shaft cam in playing position as shown, remove the bottom support bracket, link and lever assembly. Remove the "C" washer on the main cam shaft and slip the cam down far enough that it can be rotated with respect to the drive gear. Then rotate it until the timing notch is positioned as shown. Put the main gear back in mesh with the drive gear, replace the "C" washer, place the elevating lever on the cam ridge. Make certain the separator link and lever assembly is in its correct position and replace the bottom support bracket.


"A"
RATCHET LEVER
DRIVE CAM PAWL
"A"
TIMING NOTCH
STUD ON TONE ARM LEVER.
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS89

Records strike separator post or fail to stay on record shelf.

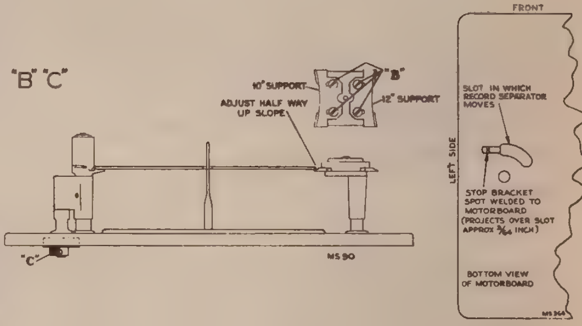
(Spacing Between Record Posts)

Turn the record support post to the ten-inch position. Loosen set screws "C," hold the separator post against the end of its slot in the motorboard and turn the belt drum to take up any slack in the belt. Tighten the zinc-plated, blunt-nosed screw and check to see that a ten-inch record fits the posts as shown. Then tighten the copper-plated, cone-pointed screw. Loosen set screws "B" and adjust support shelf so both 10- and 12-inch records set half-way up the slope when support post is turned to their respective positions.

Note:—

A small piece of metal (stop bracket) has been welded to the motor board to improve the separation and dropping of the twelve-inch records.

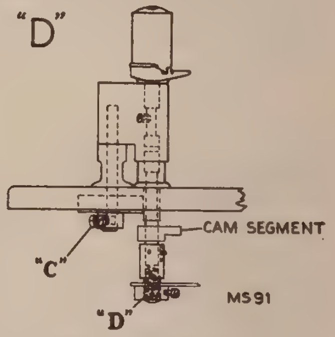
Bending the metal limits the outward movement of the record separator post, and in so doing makes it possible to equalize the distances between the spindle and the record support and separator posts.


"B" "C"
10" SUPPORT
"B"
12" SUPPORT
ADJUST HALF WAY UP SLOPE
"C"
MS90
FRONT
SLOT IN WHICH RECORD SEPARATOR MOVES
LEFT SIDE
STOP BRACKET SPOT WELDED TO MOTORBOARD (PROJECTS OVER SLOT APPROX 3/64 INCH)
BOTTOM VIEW OF MOTORBOARD
MS364

Records do not drop at proper time.

(Record Shelf Timing)

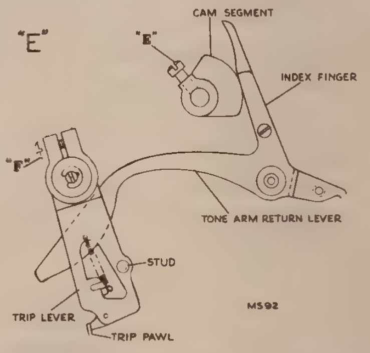
With the record supports turned to ten-inch position, place a ten-inch record on the supports. Loosen the set screws "D" and turn the record separator shaft until the edge of the record-separating knife is 3/32 inch away from the edge of the record. The teeth on the inner circumference of the knife should be resting in the bottom of their slots at the time the adjustment is made. Tighten the zinc-plated blunt-nosed screw first, run through cycle several times as a check, then tighten the cone pointed screw.
Note: It may be found necessary to deviate slightly from 3/32 inch dimension if twelve-inch records do not drop properly.


"D"
CAM SEGMENT
"C"
"D"
MS91

Tone arm continues to repeat playing of top record or jams when part way in on record.

(Segment-cam height or radial position)

With record changer in the ten-inch position and the records removed from the posts, loosen the set screw "E." Set the record separator segment-cam so that the index finger of the tone arm return lever rides on the middle of the segment-cam, as shown. Rotate the segment-cam until it is in such a position that the index finger will not ride off either end. Check to see that the index finger rides in over top of the cam when the record shelf is depressed by the weight of one record. Tighten the set screw.


"E"
CAM SEGMENT
"E"
INDEX FINGER
"F"
TONE ARM RETURN LEVER
STUD
TRIP LEVER
TRIP PAWL
MS92

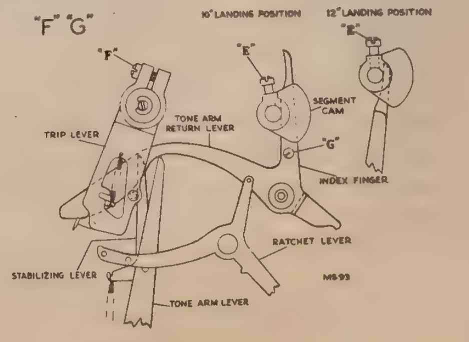
Sapphire does not land at correct point on 10-inch record.

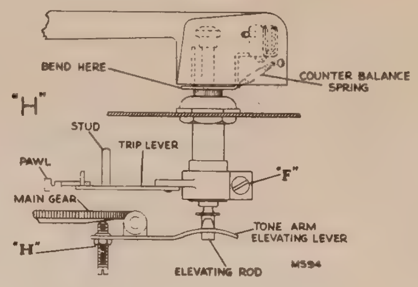
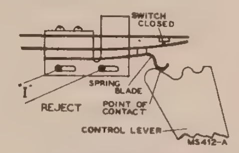
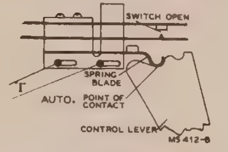
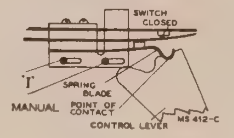
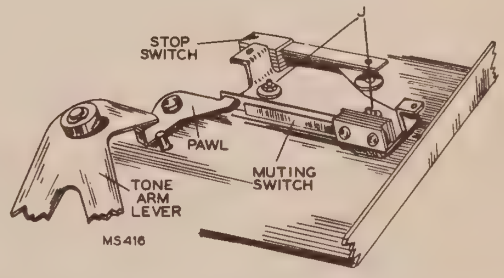
(Tone Arm Position With Respect To Trip Lever)

Correct dimension from outside edge of spindle to sapphire 4 11/16 inches.

With the record changer in the ten-inch position, place a ten-inch record on the turntable and rotate the changer through cycle by hand, until the sapphire is just ready to land. Make certain that the index finger of the pickup arm return lever is against the record separator shaft and that the tone arm trip lever stud is held firmly against the return lever. Loosen the set screw "F" and move the pickup arm to the correct landing position. Maintain correct alignment between ratchet lever and trip pawl, when tightening set screw "F." (Note—Make certain trip lever stud does not come in contact with motorboard while making this adjustment.)

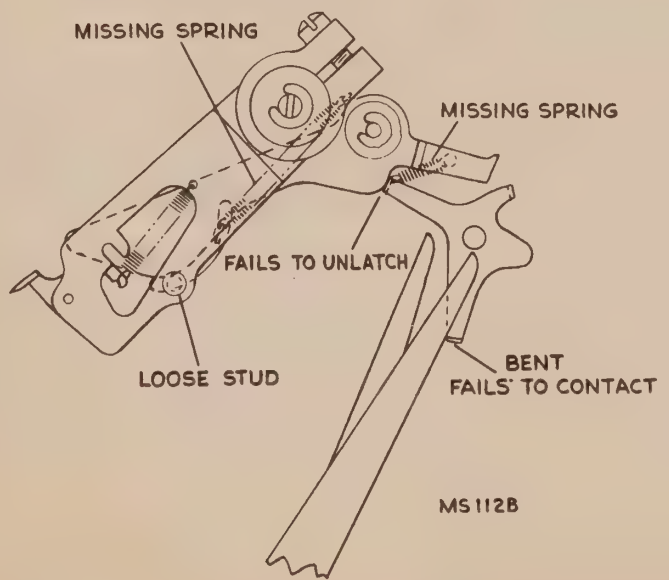
Place a twelve-inch record on the turntable and rotate the changer through cycle until the sapphire is just ready to land. Loosen screw "G" and adjust end of tone arm return lever so it is against separator shaft when pickup is in correct landing position.


"F" "G"
10" LANDING POSITION
12" LANDING POSITION
"F"
"E"
"E"
SEGMENT CAM
TONE ARM RETURN LEVER
TRIP LEVER
"G"
INDEX FINGER
RATCHET LEVER
STABILIZING LEVER
TONE ARM LEVER
MS93

Top of tone arm strikes stack of records or sapphire fails to clear the records on the turntable. **(Tone Arm Height While In Cycle)** **(Tone Arm Height While Out of Cycle)**	Rotate the changer through cycle until the tone arm has risen to its maximum height above the turntable but has not begun to move out. At this point adjust the screw "H" until the distance between the turntable and the sapphire is one and three-sixteenths inches. Tighten the locknut. Bend end of tone arm support bracket or pivot arm so the pickup end of tone arm clears the motorboard by 3/32 inch.	 BEND HERE COUNTER BALANCE SPRING "H" STUD TRIP LEVER PAWL "F" MAIN GEAR TONE ARM ELEVATING LEVER "H" ELEVATING ROD MS94
Turntable fails to rotate when the control handle is pushed to "Manual" or "Start-Reject" position. **(Control lever and switch position)**	Remove the switch cover. Loosen the two mounting screws "I" and position the switch so as to conform with the following three conditions. 1. When the control handle is in the "Start-Reject" position, the spring blade should ride up the side of the deep notch in the control lever causing the switch contacts to close. (The control handle should return to "Automatic" position automatically.) 2. When the control handle is in the "Automatic" position the spring blade should engage the deep notch in the control lever and in doing so allow the switch contacts to open. 3. When the control handle is in the "Manual" position, the spring blade should engage the shallow notch in the control lever causing the switch contacts to close and at the same time have "Manual Reject" lever move ratchet lever far enough so as to have free movement of trip lever, thereby preventing engagement between trip pawl and ratchet.	 SWITCH CLOSED "I" SPRING BLADE REJECT POINT OF CONTACT CONTROL LEVER MS412-A  SWITCH OPEN "I" SPRING BLADE AUTO. POINT OF CONTACT CONTROL LEVER MS 412-B  SWITCH CLOSED "I" SPRING BLADE MANUAL POINT OF CONTACT CONTROL LEVER MS 412-C
No output or noise coming from speaker during cycle. **(Position of pickup shorting switch)**	Remove the cover from the switch assembly. Loosen the two mounting screws "J" and position the switch assembly so the shorting switch pawl causes the switch to close during cycle and open while playing records.	 J STOP SWITCH PAWL MUTING SWITCH TONE ARM LEVER MS416

SERVICE HINTS

Incorrect Feed-in:

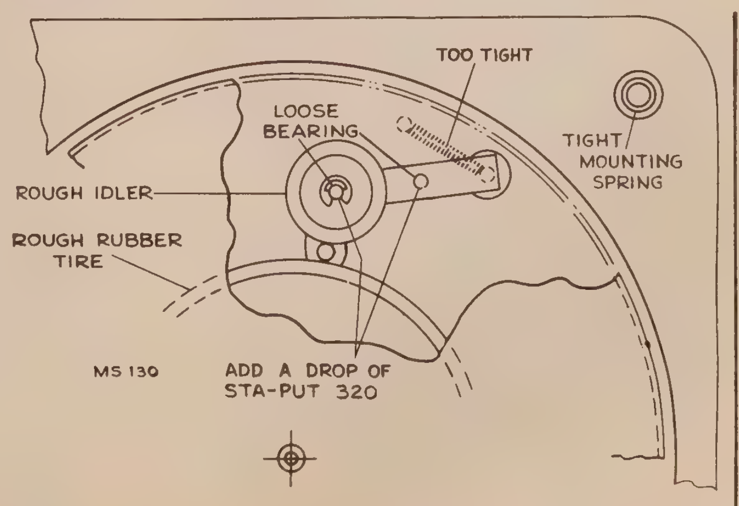

MISSING SPRING
MISSING SPRING
FAILS TO UNLATCH
LOOSE STUD
BENT
FAILS TO CONTACT
MS 112B

Feed-in Adjustment:

This instrument was originally designed with a feed-in adjustment as described in the RP-177 Service Data. Performance has been found to be satisfactory without this feature and it is not included with late production of this record changer.

In the Service Data reference is made to the feed-in feature on pages 1, 2, 3, 7, 9, 10 and 11 (Reference Nos. 38, 39 and 130). These three items are not used on late production instruments.

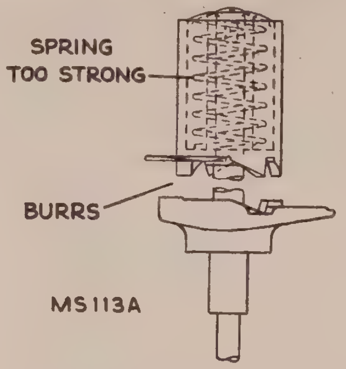
Rumble:


TOO TIGHT
LOOSE BEARING
TIGHT MOUNTING SPRING
ROUGH IDLER
ROUGH RUBBER TIRE
MS 130
ADD A DROP OF STA-PUT 320

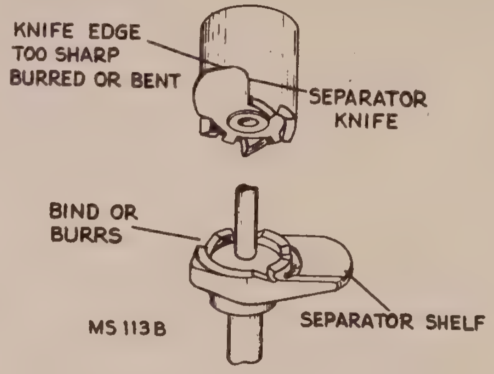
SERVICE HINTS (Continued)

Records Jam or Stack Unsteady:

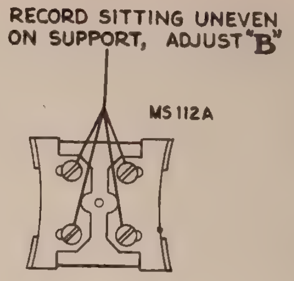
Record too thick, too thin, warped, or has rough edge.


SPRING TOO STRONG
BURRS

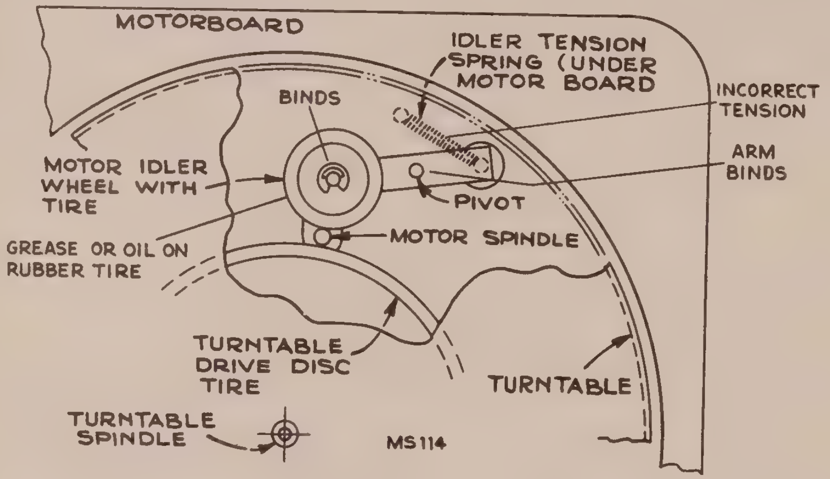
MS113A


KNIFE EDGE TOO SHARP BURRED OR BENT
SEPARATOR KNIFE
BIND OR BURRS
SEPARATOR SHELF

MS 113B


RECORD SITTING UNEVEN ON SUPPORT, ADJUST "B"

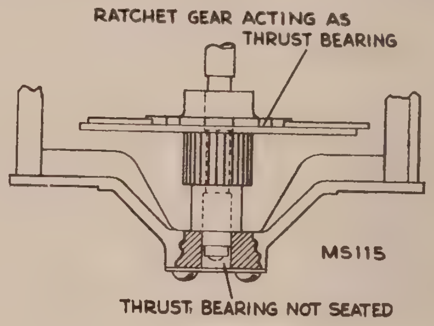
MS 112A


MOTORBOARD
IDLER TENSION SPRING (UNDER MOTOR BOARD
INCORRECT TENSION
BINDS
ARM BINDS
MOTOR IDLER WHEEL WITH TIRE
PIVOT
MOTOR SPINDLE
GREASE OR OIL ON RUBBER TIRE
TURNTABLE DRIVE DISC TIRE
TURNTABLE
TURNTABLE SPINDLE

MS 114

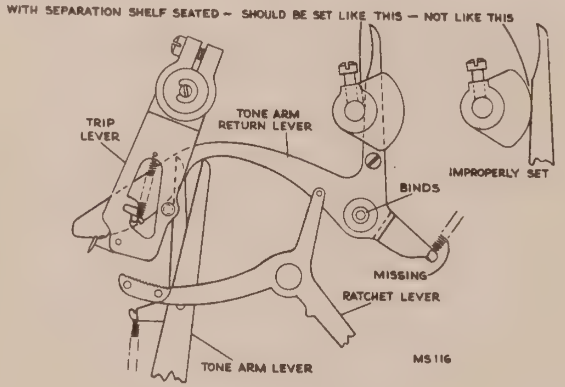
Slow Speed:

Turntable spindle binds on bottom or top bearing.

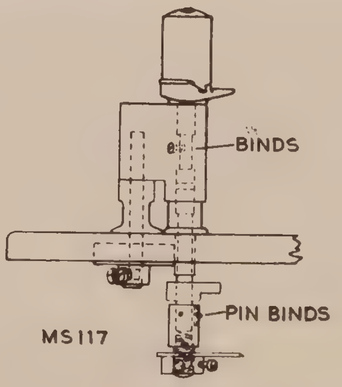

RATCHET GEAR ACTING AS THRUST BEARING
THRUST BEARING NOT SEATED

MS115

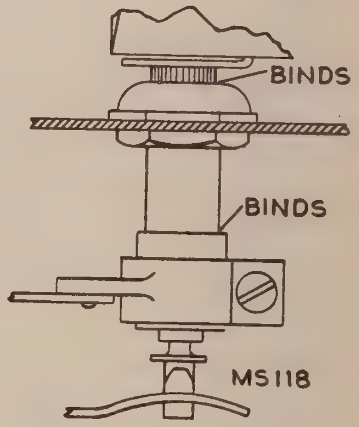
Tone Arm Continues to Come Down in Rest Position:


WITH SEPARATION SHELF SEATED – SHOULD BE SET LIKE THIS – NOT LIKE THIS
TRIP LEVER
TONE ARM RETURN LEVER
IMPROPERLY SET
BINDS
MISSING
RATCHET LEVER
TONE ARM LEVER

MS 116

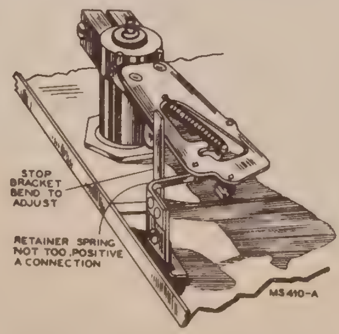

BINDS
PIN BINDS

MS 117


BINDS
BINDS

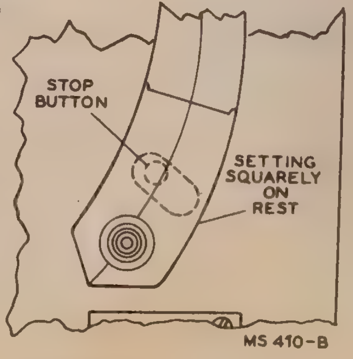
MS 118

Tone Arm Lands Incorrectly on Rest, Drifts Off of Rest, or Jumps Suddenly When Moving in for Landing:


STOP BRACKET BEND TO ADJUST
RETAINER SPRING NOT TOO POSITIVE A CONNECTION

MS 410-A

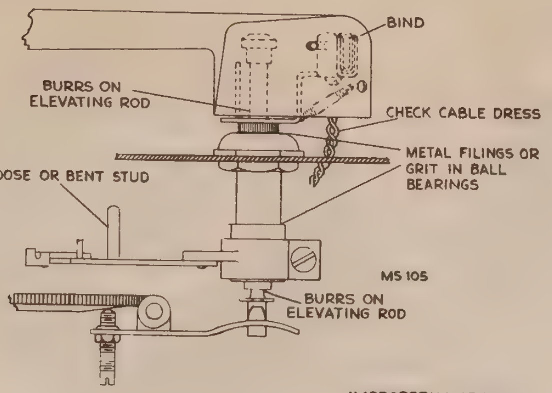
1. Bend bracket for tone arm limit stop.
2. Bend retainer spring which contacts stud on trip lever, so tone arm is stabilized while on rest or in the outermost position. Do not make too positive contact or motion of tone arm will start with a sudden jump.

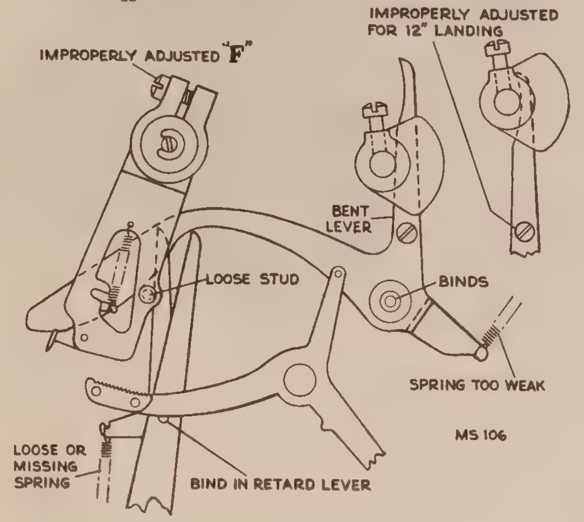

STOP BUTTON
SETTING SQUARELY ON REST

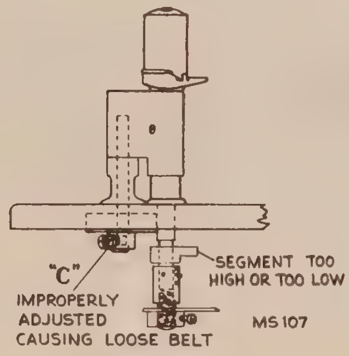
MS 410-B

SERVICE HINTS (Continued)

Lands Incorrectly:

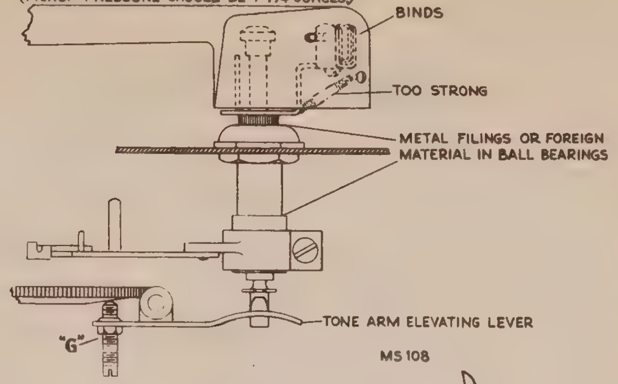

BIND
BURRS ON ELEVATING ROD
CHECK CABLE DRESS
METAL FILINGS OR GRIT IN BALL BEARINGS
LOOSE OR BENT STUD
MS 105
BURRS ON ELEVATING ROD

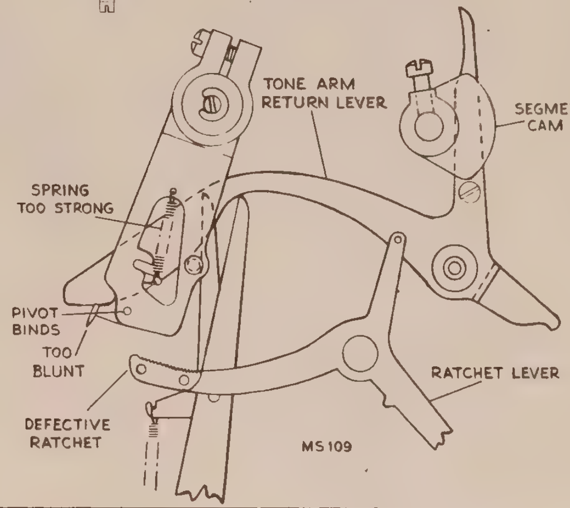

IMPROPERLY ADJUSTED FOR 12" LANDING
IMPROPERLY ADJUSTED "F"
BENT LEVER
LOOSE STUD
BINDS
SPRING TOO WEAK
MS 106
LOOSE OR MISSING SPRING
BIND IN RETARD LEVER


"C"
IMPROPERLY ADJUSTED CAUSING LOOSE BELT
SEGMENT TOO HIGH OR TOO LOW
MS 107

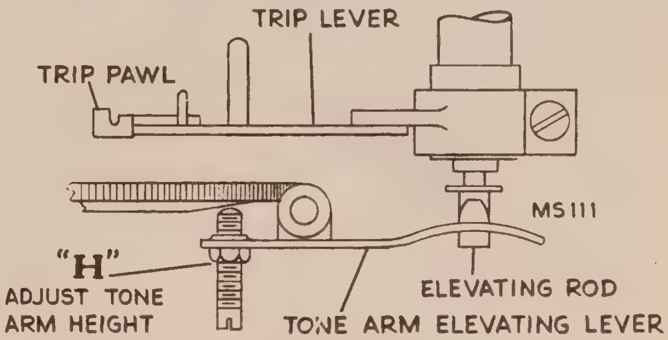
Repeats Grooves:

(PICKUP PRESSURE SHOULD BE 1-1¼ OUNCES)


BINDS
TOO STRONG
METAL FILINGS OR FOREIGN MATERIAL IN BALL BEARINGS
TONE ARM ELEVATING LEVER
"G"
MS 108


TONE ARM RETURN LEVER
SEGMENT CAM
SPRING TOO STRONG
PIVOT BINDS
TOO BLUNT
DEFECTIVE RATCHET
RATCHET LEVER
MS 109

Tone Arm Touches Record on Separator Shelf:


TRIP LEVER
TRIP PAWL
MS111
"H"
ADJUST TONE ARM HEIGHT
ELEVATING ROD
TONE ARM ELEVATING LEVER

(SERVICE HINTS continued on page 12.)

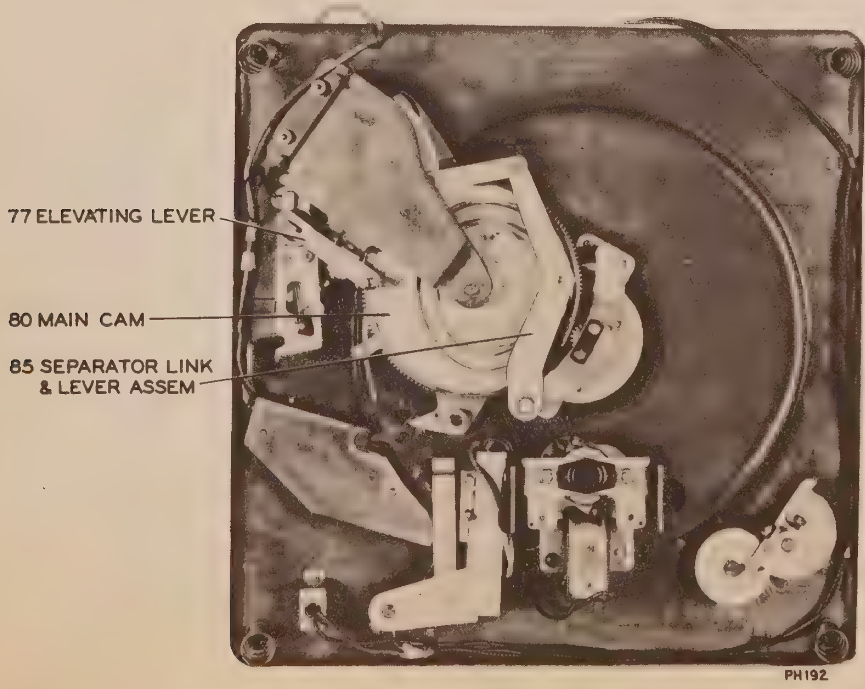

77 ELEVATING LEVER
80 MAIN CAM
85 SEPARATOR LINK & LEVER ASSEM
PH192

FIG. 2

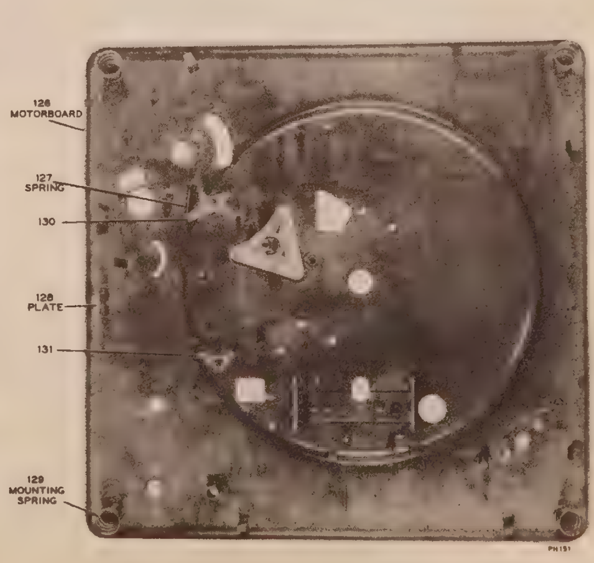
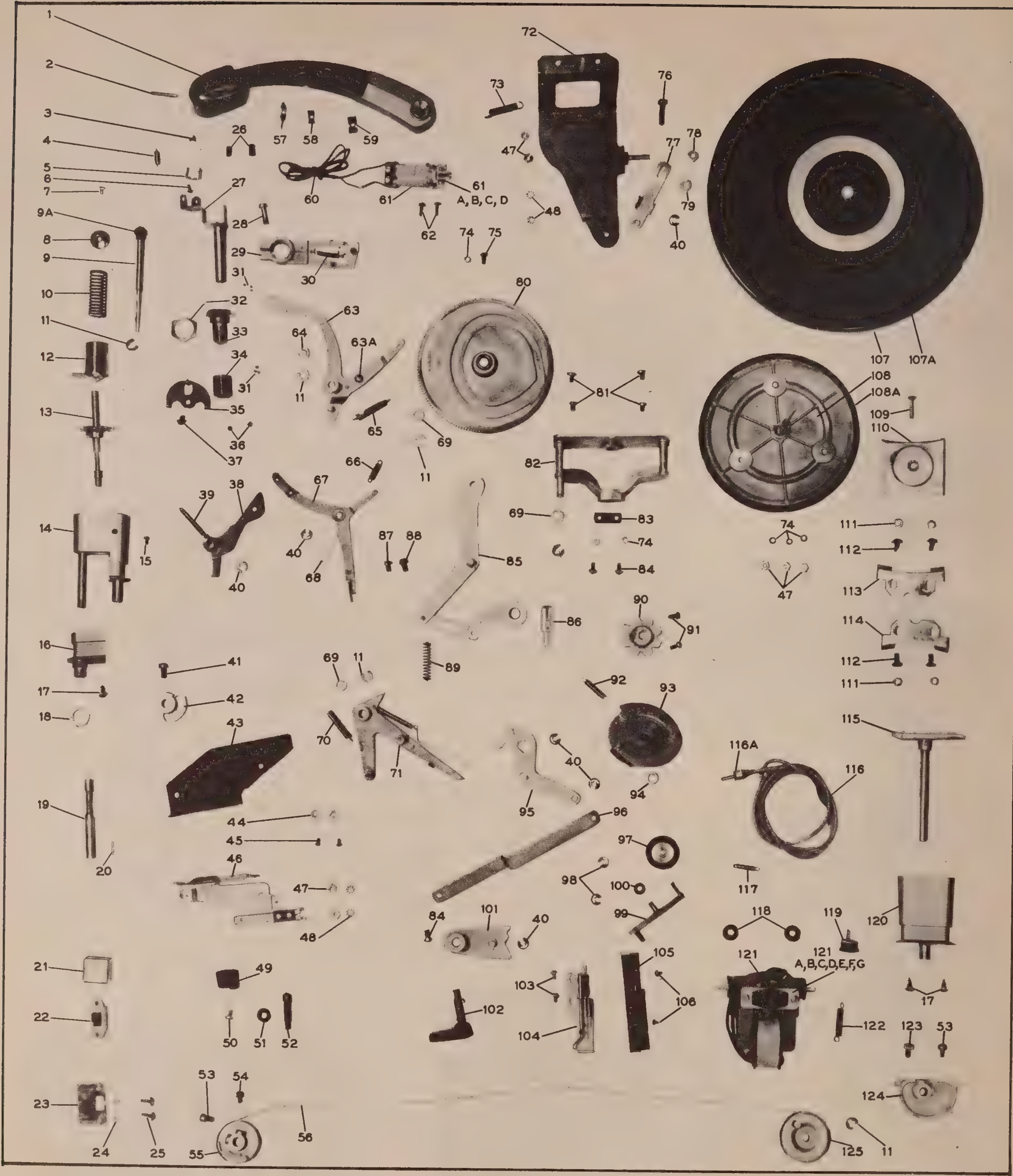

126 MOTORBOARD
127 SPRING
130
128 PLATE
131
129 MOUNTING SPRING
PH191

FIG. 3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A, B, C, D
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63A
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107A
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108A
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116A
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A,B,C,D,E,F,G
122
123
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125
11

FIG. 4

REPLACEMENT PARTS

Stock No.	Ref. No.	DESCRIPTION
72397	1	Arm—Pickup arm shell only less crystal, cable and pivot arm
70905	2	Pin—Pivot pin
39674	3	Stud—Pivot arm spring stud
71099	4	Spring—Pivot arm spring (.187" O.D. x ¾"—24 turns)
71098	5	Clamp—"U" clamp to lock pivot arm in position
71097	6	Screw—#4-40 x ¼" long self tapping screw to lock pivot clamps
72414	7	Screw—#6-32 x ¼" oval head screw for record separator cap
72415	8	Cap—Record separator cap
70909	9	Rod—Pusher rod including rubber cushion
38607	9A	Cushion—Rubber cushion for pusher rod
70895	10	Spring—Record separator spring—upper (.622" O.D. x 1-11/16"—13½ turns)

REPLACEMENT PARTS (Continued)

Stock No.	Ref. No.	DESCRIPTION
2917	11	Washer—"C" washer for lift rod, drum and belt, tone arm return lever, link, tone arm lever and main cam
*72416	12	Knife—Record separator knife
*72413	13	Shelf—Record separator shelf and shaft
*72399	14	Swivel—Record separator swivel and shaft
*72400	15	Screw—Record separator swivel and shaft screw
*72589	16	Support—Record separator support
†..........	17	Screw—#10 x ⅜" self tapping screw
70890	18	Nut—9/16-32 hex nut for record separator support
71280	19	Shaft—Record separator bottom shaft
71103	20	Pin—Drive pin for record separator shaft end bushing
71106	21	Cover—Metal cover for "On-Off" switch
72407	22	Switch—"On-Off" switch
72591	23	Escutcheon—Index escutcheon
†..........	24	Nut—Hex nut #4-40
72588	25	Screw—#4-40 x 5/16" binder head screw for "On-Off" switch
†..........	26	Insulation—Two small pieces of spaghetti
70906	27	Arm—Pivot arm and shaft
72402	28	Screw—#10-32 x ⅝" fillister head screw for trip lever
70856	29	Lever—Trip lever less spring
71543	30	Spring—Trip lever spring (.135" O.D. x 21/32" —58 turns)
3658	31	Ball—Steel ball (3/32" dia.)
70886	32	Nut—¾-32" hex nut for pickup arm pivot bearing
72585	33	Bushing—Pivot arm bushing (upper)
70911	34	Bushing—Pivot arm bushing (lower)
72655	35	Disc—Feed-in adjusting disc
5042	36	Screw—#8-32 x ⅛" set screw for lower pivot arm bushing
72408	37	Screw—#8-32 x ¼" binder head screw for feed-in adjusting disc
70873	38	Lever—Feed-in lever
71550	39	Spring—Feed-in adjusting disc spring (.160" O.D. x 1⅜"—82 turns)
20165	40	Washer—"C" washer for ratchet lever, manual operating lever, manual detent lever and feed-in lever and tone arm lift lever
32869	41	Screw—#10-32 x ¼" fillister head screw for tone arm control lever
70848	42	Cam—Shut-off or segment cam, fastens on record separator shaft
70855	43	Cover—Stop switch cover
†..........	44	Washer—Lockwasher #4
†..........	45	Screw—Round head screw #4-40 x 3/16" long
70876	46	Switch—Stop and muting switch, mounted on bracket
†..........	47	Nut—Hex nut #6-32
†..........	48	Washer—Lockwasher #6
72820	49	Rest—Pickup arm rest
....	50	Screw—Self tapping screw #10-⅜" long
32943	51	Nut—Pickup stop switch button speed nut
71102	52	Button—Pickup stop switch button
32869	53	Screw—#10-32 x 5/16" fillister head screw for record support shaft cam, flat end or #10-32 x 5/16" fillister head machine screw for record separator drum
72562	54	Screw—#10-32 x 5/16" fillister head set screw for record separator drum
70898	55	Drum—Record separator drum
70900	56	Belt—Record separator to support belt
71279	57	Nut—Speed nut to hold cable, rear of pivot arm
71095	58	Nut—Speed nut to hold cable, rear of arm
38458	59	Nut—Speed nut to hold cable, front of arm
72584	60	Cable—Pickup cable, twisted pair
72551	61	Crystal—Crystal cartridge complete
38452	61A	Guard—Needle guard
70341	61B	Nut—Mounting washer and nut for sapphire
72345	61C	Sapphire—Sapphire and holder assembly
37763	61D	Screw—#2-56 x ⅛" screw for needle guard
70912	62	Screw—#4-40 x ⅜" binder head screw to mount crystal (2 required)
70847	63	Lever—Tone arm return lever
72401	63A	Screw—Tone arm return lever screw
70884	64	Washer—Bearing washer for tone arm return lever
71726	65	Spring—Tone arm return lever spring (.218" O.D. x 1½"—48½ turns)
71549	66	Spring—Tone arm lever spring or ratchet lever spring (.180" O.D. x ⅞"—54½ turns)
73053	67	Lever—Ratchet lever
†..........	68	Washer—Steel washer O.D. ½" I.D., .193", T .020"
70877	69	Washer—.280" I.D. x 7/16" flat washer for link, tone arm lever and main cam
71547	70	Spring—Tone arm lever tension spring (.218" O.D. x 1½"—48½ turns)
70858	71	Lever—Tone arm lever less spring
72420	72	Brace—Bottom support for tone arm lift lever and main cam
71544	73	Spring—Drum and belt tension spring (.255" O.D. x 1⅜"—27½ turns)
†..........	74	Washer—#6 lockwasher
†..........	75	Screw—#6-32 x 5/16"
39691	76	Screw—#10-32 x ⅞" fillister head screw for adjusting tone arm lift lever
38631	77	Lever—Tone arm elevating lever
71104	78	Nut—#10-32 hex locknut for tone arm lift lever adjusting screw
†..........	79	Washer—Washer, O.D. 7/16", I.D. 3/16", T 1/32"
70864	80	Cam—Main cam
72409	81	Screw—#8-32 x ¼" binder head screw for turntable spindle support
70891	82	Support—Turntable spindle support bearing
70880	83	Plate—Spring thrust plate for turntable
70883	84	Screw—#6-32 x 5/16" round head screw for turntable spring plate
70852	85	Link—Record separator shaft link and lever
70849	86	Bushing—Record separator shaft and bushing
71100	87	Screw—#10-32 x 5/16" round head screw for link
31118	88	Screw—#10-32 x 5/16" fillister head screw for link or for automatic—manual—reject detent lever
70850	89	Spring—Record separator shaft bottom spring (.290" O.D. x 1.35"—14¾ turns)
38624	90	Ratchet—Ratchet wheel (drive cam sprocket) for turntable drive
38626	91	Screw—#8-32 x ¼" fillister head set screw for ratchet wheel
70854	92	Spring—Drive shaft cam and pawl spring (.195" O.D. x 1-3/16"—42 turns)
70853	93	Cam—Drive shaft cam and pawl
70879	94	Washer—Washer for cam and pawl
72403	95	Lever — Automatic — manual — reject operating lever
72406	96	Link—Link for automatic—reject—manual operating and detent levers
36274	97	Wheel—Idler wheel
33726	98	Washer—"C" washer for idler wheel and arm
70863	99	Arm—Motor idler arm—less wheel
39996	100	Washer—Fibre washer for idler wheel
72404	101	Lever—Automatic—manual—reject detent lever
72586	102	Lever—Reject lever (handle)
†..........	103	Screw—Hex. head 6-32 x ¼" self-tapping screw
72410	104	Switch—Manual shorting switch
72411	105	Cover—Manual shorting switch cover
†..........	106	Screw—#4-40 x ⅛" round head machine screw
72421	107	Turntable—Turntable including rubber mat less drive disc and tire
70866	107A	Mat—Rubber mat only for turntable
73054	108	Spindle—Turntable spindle drive less tire
37873	108A	Tire—Rubber drive tire
72587	109	Screw—#10-32 x ¾" oval head screw for record support cap
72423	110	Cap—Record support cap
†..........	111	Washer—Approx. 7/16" O.D., 3/16" I.D., .030 T
70861	112	Screw—#10-32 x ⅜" binder head screw for record supports
72418	113	Support—Record support for 12" records
72417	114	Support—Record support for 10" records
72419	115	Shelf—Record support shelf and shaft
72708	116	Cable—Shielded output cable complete with pin plug
31048	116A	Plug—Pin plug for shielded output cable
71546	117	Spring—Idler arm tension spring (.187" O.D. x ⅞"—31 turns)
34368	118	Grommet—Rubber grommet to mount motor (2 required)
30870	119	Plug—2-prong male plug for power cable
72590	120	Base—Record support base
38612	121	Motor—105-125 volts, 60 cycle
37107	121A	Bearing—Top bearing and bracket
37108	121B	Bearing—Bottom bearing and bracket
37109	121C	Bracket—Motor mounting bracket
37111	121D	Coil—Motor field coil
37106	121E	Pad—Rotor thrust pad
37110	121F	Rotor—Motor rotor complete with fan
39749	121G	Spring—60 to 50 cycle conversion spring
71545	122	Spring—Motor tension spring (.192" O.D. x 1½" —58 turns)
39772	123	Screw—#10-32 x 5/16" fillister head set screw for record support shaft cam—cone point
70845	124	Cam—Record support shaft cam
70899	125	Drum—Record support drum
72398	126	Motorboard—Motorboard sub-assembly complete with all welded, staked and riveted parts—less operating parts
71548	127	Spring—Feed-in control spring (.160" O.D. x 11/16"—52 turns)
72412	128	Plate—Anti-drift spring and plate for tone arm (retainer spring)
38873	129	Spring—Conical spring to mount record changer (4 required)
†..........	130	Lever—Feed-in lever locking pawl or latch. Part of motorboard
†..........	131	Lever—Muting switch actuating lever. Part of motorboard.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

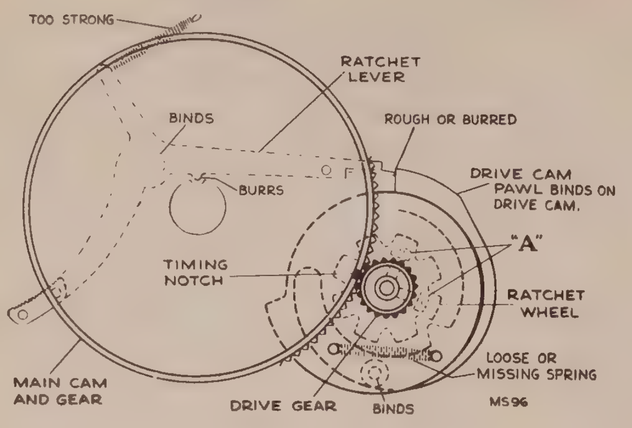
† These parts are not stocked.

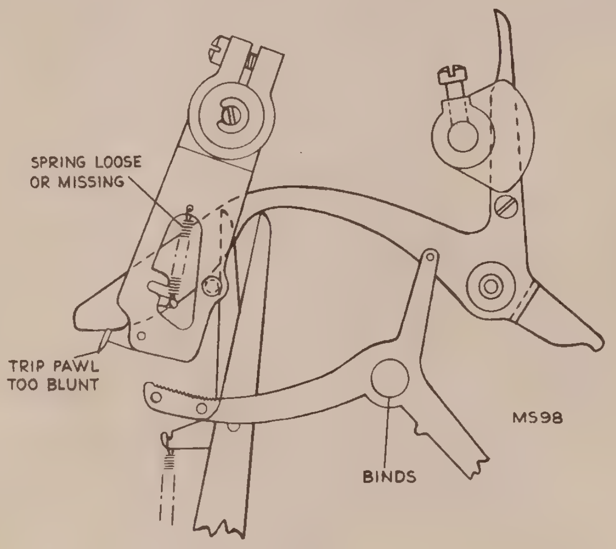
Addition to Parts List:

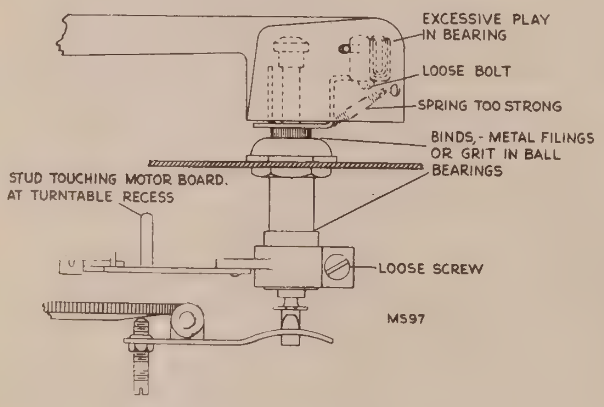
Stock No.	
73198	Curved spring for anchoring pivot arm spring.

SERVICE HINTS (Continued)

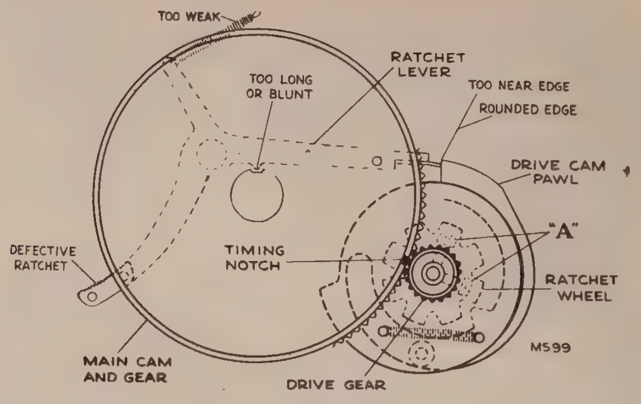
Fails to Trip:

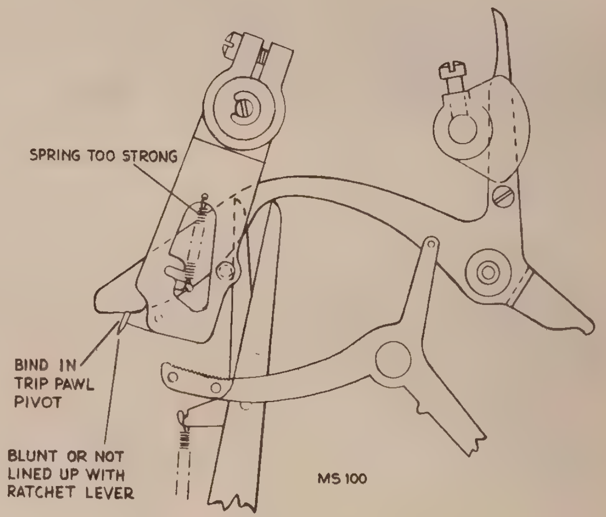

TOO STRONG
RATCHET LEVER
BINDS
ROUGH OR BURRED
BURRS
DRIVE CAM PAWL BINDS ON DRIVE CAM.
TIMING NOTCH
"A"
RATCHET WHEEL
LOOSE OR MISSING SPRING
MAIN CAM AND GEAR
DRIVE GEAR
BINDS
MS96


SPRING LOOSE OR MISSING
TRIP PAWL TOO BLUNT
BINDS
MS98

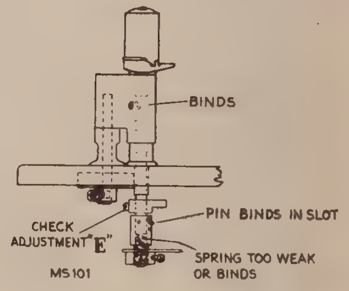

EXCESSIVE PLAY IN BEARING
LOOSE BOLT
SPRING TOO STRONG
BINDS,- METAL FILINGS OR GRIT IN BALL BEARINGS
STUD TOUCHING MOTOR BOARD. AT TURNTABLE RECESS
LOOSE SCREW
MS97

Trips Early:

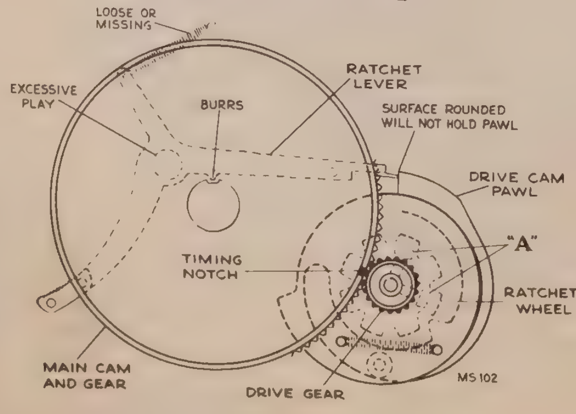

TOO WEAK
RATCHET LEVER
TOO LONG OR BLUNT
TOO NEAR EDGE
ROUNDED EDGE
DRIVE CAM PAWL
DEFECTIVE RATCHET
TIMING NOTCH
"A"
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS99

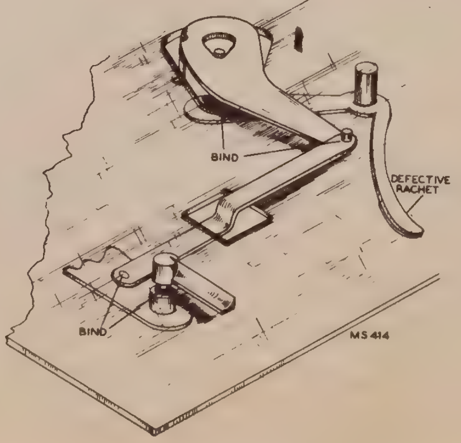

SPRING TOO STRONG
BIND IN TRIP PAWL PIVOT
BLUNT OR NOT LINED UP WITH RATCHET LEVER
MS 100

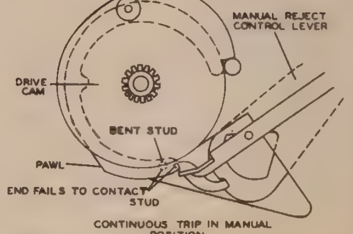
Repeats Playing of Last Record:


BINDS
PIN BINDS IN SLOT
CHECK ADJUSTMENT "E"
SPRING TOO WEAK OR BINDS
MS101

Trips Continuously:


LOOSE OR MISSING
EXCESSIVE PLAY
RATCHET LEVER
BURRS
SURFACE ROUNDED WILL NOT HOLD PAWL
DRIVE CAM PAWL
TIMING NOTCH
"A"
RATCHET WHEEL
MAIN CAM AND GEAR
DRIVE GEAR
MS 102


BIND
DEFECTIVE RACHET
BIND
MS 414


MANUAL REJECT CONTROL LEVER
DRIVE CAM
BENT STUD
PAWL
END FAILS TO CONTACT STUD
MS 415

CONTINUOUS TRIP IN MANUAL POSITION

RCA VICTOR

VICTROLA 610V1, 610V2

Chassis No. RC-610C........RC-610, RC-610C

AM-FM Radio-Phonograph Combination

FOR RECORD CHANGER INFORMATION REFER TO SERVICE DATA FOR RP-177 OR 960001 SERIES

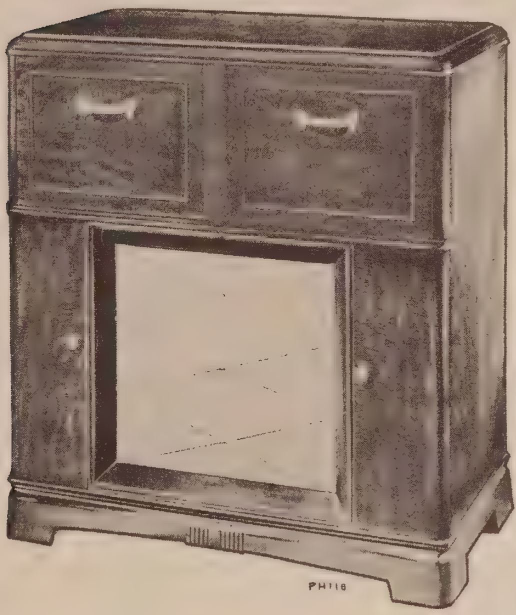
Mfr. No. 274

SERVICE DATA

—1946 No. 17—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 610V1



Model 610V2

AUTOMATIC RECORD CHANGER

Type Pickup	Crystal
Record Capacity	Twelve 10-in., Ten 12-in.
Either of two types may be used	
RP-177 or 960001-5	610V1, 610V2—Walnut & Mahogany
960001-6	610V2—Blonde

Circuit Description

Models 610V1 and 610V2 have individual built-in antennas for FM and AM coupled to individual 1st Det.-Osc. tubes (6BE6 V1 and V2). The outputs of these two tubes are connected to separate IF transformers (T1 and T2) whose secondaries are in series and connected to the IF amplifier tube (6BA6 V3). The output of V3 is connected to separate IF transformers (T3 and T4) whose primaries are in series. The secondary of T3 (FM IF) is connected to the driver tube (6AU6 V4). The secondary of T4 (AM IF) is connected to the AM second detector (6SQ7 V6). The output of the driver tube (V4) is coupled thru the driver transformer (T5) and ratio detector transformer (T6) to the FM ratio detector tube (6AL5 V5). [In 610V1 the functions of both T5 and T6 are combined in one unit (T5).]

The audio outputs of the AM second detector and the FM ratio detector are connected thru a section of the range switch to the volume control input.

The B+ supply (+245 V) to the plates and screen grids of V1 and V2 is controlled thru a section of the range switch.

Simple AVC is used on AM and is applied to both the IF amplifier (V3) and the AM 1st detector (V2). Delayed AVC is used on FM and is applied only to the IF amplifier (V3). The AVC distribution is controlled thru a section of the range switch.

Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast (BC)	540-1600 kc.
Frequency Modulation (FM)	88-108 mc.
Push Button Tuning (PB)	6 stations
1 Station	540-1030 kc.
2 Stations	610-1250 kc.
2 Stations	740-1430 kc.
1 Station	880-1600 kc.
Intermediate Frequency (AM)	455 kc.
Intermediate Frequency (FM)	10.7 mc.

TUBE COMPLEMENT

(1) RCA 6BE6	FM 1st Det.-Osc.
(2) RCA 6BE6	AM 1st Det.-Osc.
(3) RCA 6BA6	IF Amplifier
(4) RCA 6AU6	Driver
(5) RCA 6AL5	FM Ratio Detector
(6) RCA 6SQ7	AM 2nd Det.-AVC-Phase Inverter
(7) RCA 6SQ7	AF Amplifier
(8) RCA 6K6GT	Output
(9) RCA 6K6GT	Output
(10) RCA 5Y3GT	Rectifier

POWER OUTPUT

Undistorted	5 watts
Maximum	6.5 watts

LOUDSPEAKER

Type (92569-1)	12 inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

POWER SUPPLY RATING (including phono motor)

105-125 volts, 60 cycles	max. 116 watts

(This instrument can be converted to operate on 50 cycles.)

Pilot Lamps (3)	Mazda No. 51 6-8 volts 0.2 amp.
Tuning Drive Ratio	16.25:1

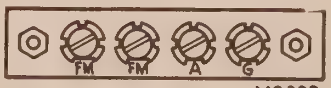
CABINET DIMENSIONS

	Height	Width	Depth
610V1	36″	35-1/16″	18″
610V2	36″	34-9/16″	17-5/8″

Antennas

Under conditions of normal field strength and interference, the RCA Victor antennas installed inside the cabinet will be effective for Frequency Modulation and Standard Broadcasts.

If reception is not satisfactory on one or both of the bands using the built-in cabinet antennas, one or two external antennas may be used. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna Stock No. 225 or 226 or the equivalent with 300 ohm transmission line is recommended for an FM external antenna. In this case, disconnect the two leads at the two terminals marked "FM" and attach the ends of the two lead wires from the RCA Television Antenna transmission line in their places. To replace the Standard Broadcast antenna, open the link across the terminals A-G and connect the lead-in from the antenna to terminal A. This antenna should consist of a wire 30 to 60 feet or so in length, mounted in a convenient location as high as possible. A ground connection to G should not be necessary but a flexible wire to a waterpipe or other good ground may be used.



MS328

Alignment Procedure

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation below. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations, except FM IF-RF, connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

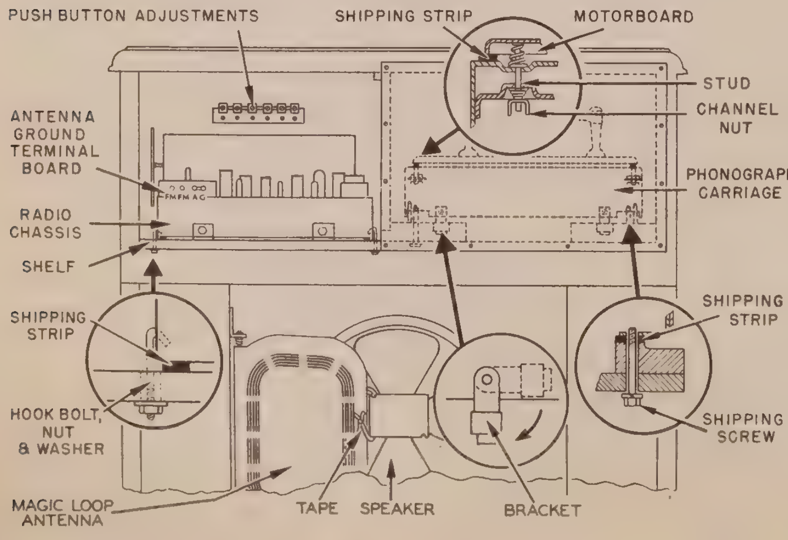
1. Cut out the printed dial scale, or, better still, make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the first reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as a nalignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

(RC-610C) FM Ratio Detector Alignment

RANGE SWITCH IN FM POSITION—VOL. CONT. MAXIMUM

Steps	Connect high side of sig. gen. to—	Signal generator output	Adjustments and indications
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor, C20, the common lead of the VoltOhmyst to chassis.		
2	Pin 1 of driver tube 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .1 volt)	Top core T5 for max. d-c across C20 (Approx. 4 volts) Bottom core T5 for minimum audio output
3	Repeat Step 2 until further adjustment does not improve alignment.		



Back View

610V2 (RC-610) FM Ratio Detector Alignment

RANGE SWITCH IN FM POSITION—VOL. CONT. MAXIMUM

Steps	Connect high side of sig. gen. to—	Signal generator output	Adjustments and indications
1	Connect a 680 ohm resistor between pins 5 and 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor, C20, the common lead of the VoltOhmyst to chassis.		
2	Pin 1 of driver tube 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .25 volt)	Driver trans. T5, for max. d-c across C20 (Approx. 14.5 volts)
3	Disconnect the VoltOhmyst and the 680 ohm resistor from the 6AL5. Connect two 68,000 ohm resistors (within 1% of each other) in series across the 22,000 ohm resistor R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors and the d-c probe to terminal "A" of the ratio detector trans. T6. Use 30 volt scale of VoltOhmyst first, reducing to lower scale as required.		
4	Same as Step 2	Same as Step 2	†T6 bottom core for zero d-c balance. †T6 top core for min. audio output.
5	Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor.		
6	Repeat Step 2.		
7	Remove ALL connections.		

† Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and an output meter, hooked across the voice coil for the point at which both zero d-c and minimum a-f output occur.

FM IF-RF Alignment

(FM Ratio Detector must be aligned first.)

RANGE SWITCH IN FM POSITION

Steps	Connect sig. gen.	Sig. gen. output	Turn radio dial to—	Adjustment for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor C20 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	High side to one FM ant. term. in series with .01 mfd. Low side to the other FM ant. term.	10.7 mc 30% modulation, 400 cycles AM. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Max. capacity (fully meshed)	*Using alternate loading: T3 bottom core (sec.) T3 top core (pri.) T1 bottom core (sec.) T1 top core (pri.)
3	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	106 mc	106 mc	C54 osc. C52 ant.
4	Same as Step 3.	90 mc	90 mc	L3 osc. L2 ant.
5	Repeat Steps 3 and 4 until further adjustment does not improve calibration.			

* Alternate loading involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 680 ohm resistor after T3 and T1 have been aligned.

AM Alignment

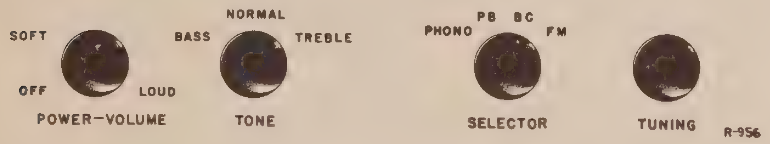
(Correct alignment of the 455 kc. IF requires that the 10.7 mc. IF be aligned previously.)

RANGE SWITCH IN BC POSITION

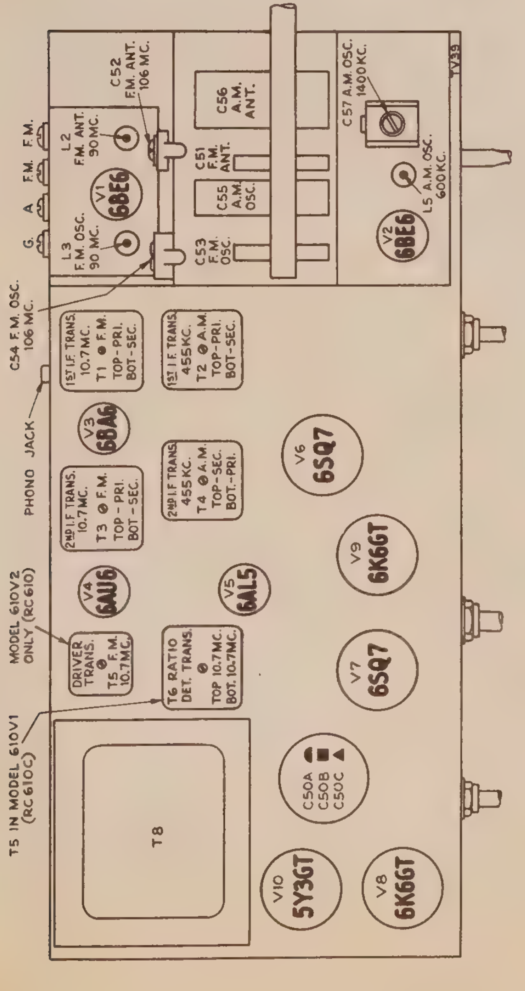
Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM converter grid 6BE6 V-2 in series with .01 mfd.	455 kc	Quiet point at low freq. end.	*T4 top core (sec.) *T4 bottom core (pri.)
2				*T2 bottom core (sec.) *T2 top core (pri.)
3	"A" terminal of terminal board at rear of chassis in series with 200 mmf. (link open)	1400 kc	1400 kc	C57 osc. C58 ant. (loop)
4		600 kc	600 kc	L5 osc. (Rock gang)
5	Repeat Step 3.			
6	After chassis and loop have been installed in cabinet, adjust C58 for max. output on a weak station near 1400 kc.			

*Align T4 and T2 by means of alternate loading as explained under FM IF-RF alignment. Use a 47,000 ohm resistor instead of a 680 ohm resistor.

Oscillator frequency is above signal frequency on both AM and FM.


SOFT
OFF
LOUD
POWER—VOLUME
NORMAL
BASS
TREBLE
TONE
PB BC
PHONO
FM
SELECTOR
TUNING
R-956

Front Panel Controls

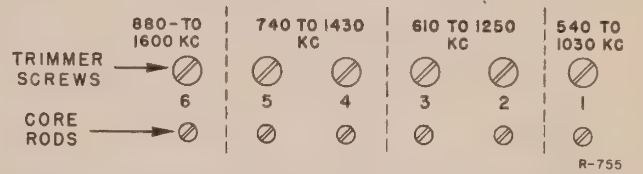

G.
A
F.M.
F.M.
L3 F.M. OSC. 90 MC.
L2 F.M. ANT. 90 MC.
C52 F.M. ANT. 106 MC.
V1 6BE6
C53 F.M. OSC.
C55 A.M. OSC.
C51 F.M. ANT.
C56 A.M. ANT.
C57 A.M. OSC. 1400 KC.
L5 A.M. OSC. 600 KC.
V2 6BE6
C54 F.M. OSC. 106 MC.
PHONO JACK
1st I.F. TRANS. 10.7 MC. T1 @ F.M. TOP-PRI. BOT-SEC.
1st I.F. TRANS. 455 KC. T2 @ A.M. TOP-PRI. BOT-SEC.
V3 6BA6
V6 6SQ7
2nd I.F. TRANS. 10.7 MC. T3 @ F.M. TOP-PRI. BOT-SEC.
2nd I.F. TRANS. 455 KC. T4 @ A.M. TOP-SEC. BOT-PRI.
V4 6AU6
V5 6AL5
V9 6K6GT
MODEL 610V2 ONLY (RC610)
DRIVER TRANS. T5 F.M. 10.7 MC.
T6 RATIO DET. TRANS. TOP 10.7 MC. BOT. 10.7 MC.
V7 6SQ7
T5 IN MODEL 610V1 (RC610C)
T8
C50A C50B C50C
V10 5Y3GT
V8 6K6GT

Top View Chassis

Critical Lead Dress

1. Dress capacitor C1 near chassis base.
2. Dress lead from pin 5, V-1, to terminal C, of transformer T1, as near bottom of FM shelf as possible.
3. The lead from capacitor C23 to the high side of the volume control must be dressed next to chassis along front apron.
4. Dress resistor R20 near chassis base.
5. Dress all A.C. leads away from volume control.
6. Solder FM antenna coil primary leads to terminal board with as short a lead length as is practical.
7. Make all FM leads as short as possible.
8. The lead from pin 2, V-3, to chassis ground must be dressed as close to base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length nor the point at which it is grounded to the chassis should be changed.
9. Dress all leads away from the 3300 ohm resistors R28 and R29.
10. The green lead that is connected from the oscillator variable capacitor (C55) to terminal #11 of S-1 rear is to be dressed from C55 through the chassis base and between the chassis base and the leads of V2 socket to #11 of S-1 rear.

Push Button Adjustment


880-TO 1600 KC
740 TO 1430 KC
610 TO 1250 KC
540 TO 1030 KC
TRIMMER SCREWS
6
5
4
3
2
1
CORE RODS
R-755

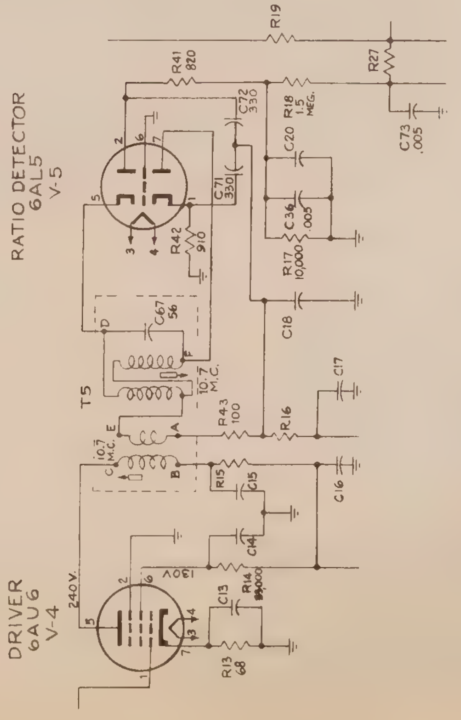
The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

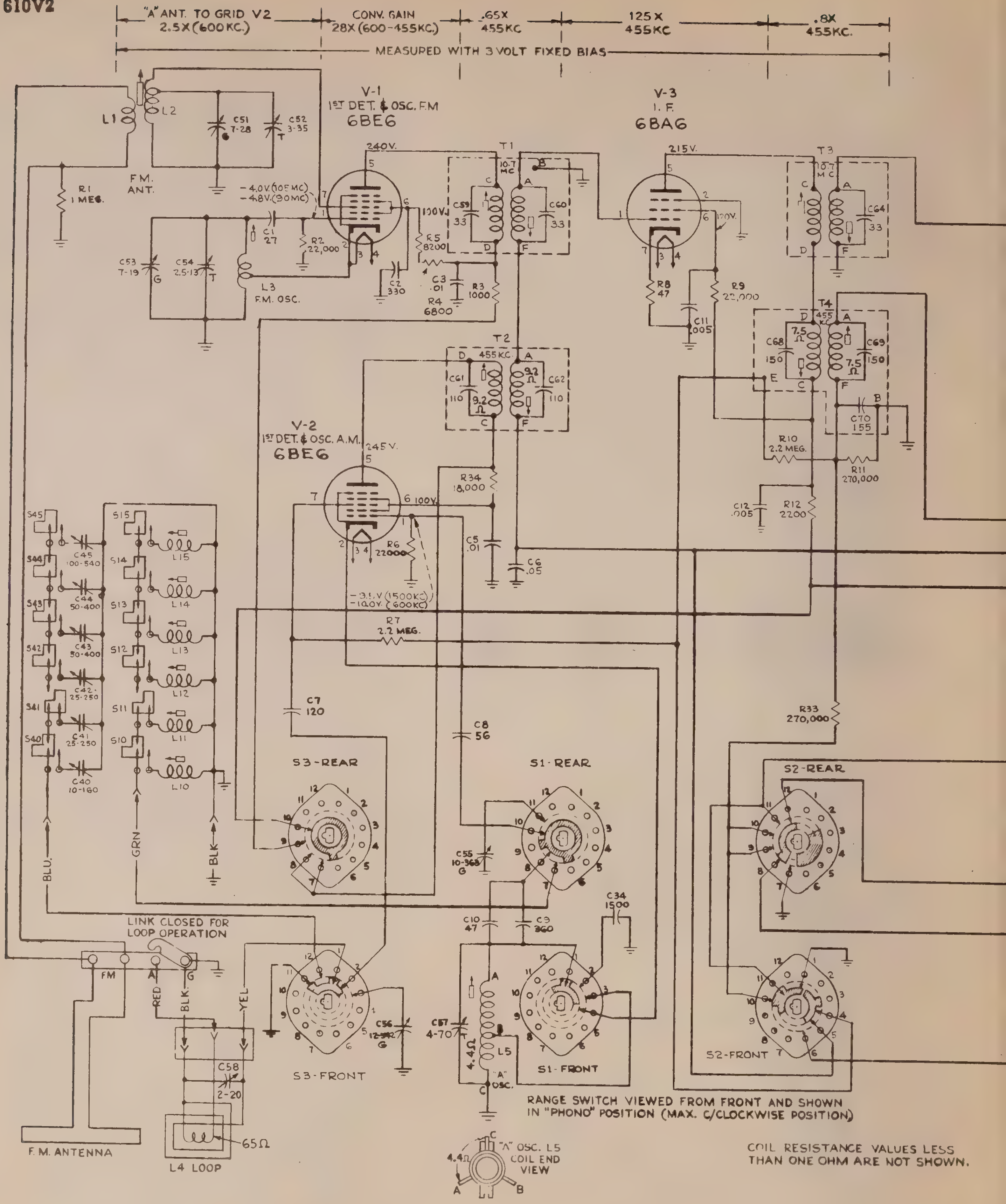
NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.


RATIO DETECTOR 6AL5 V-5
R19
R41 820
R27
C72 330
R18 1.5 MEG.
C73 .005
C20
C71 330
C36 .005
R42 910
R17 10,000
C67 56
C18
T5
10.7 MC.
C17
R43 100
R16
A
B
C
D
E
F
10.7 MC.
R15
C15
C16
C14
130V
R14
C13
240V.
DRIVER 6AU6 V-4
R13 68

RATIO DETECTOR CIRCUIT, CHASSIS No. RC-610C

Schematic Diagram otherwise same as 610V2 (RC-610), except C59 of 1st I.F. Trans (FM) is omitted.

610V1, 610V2

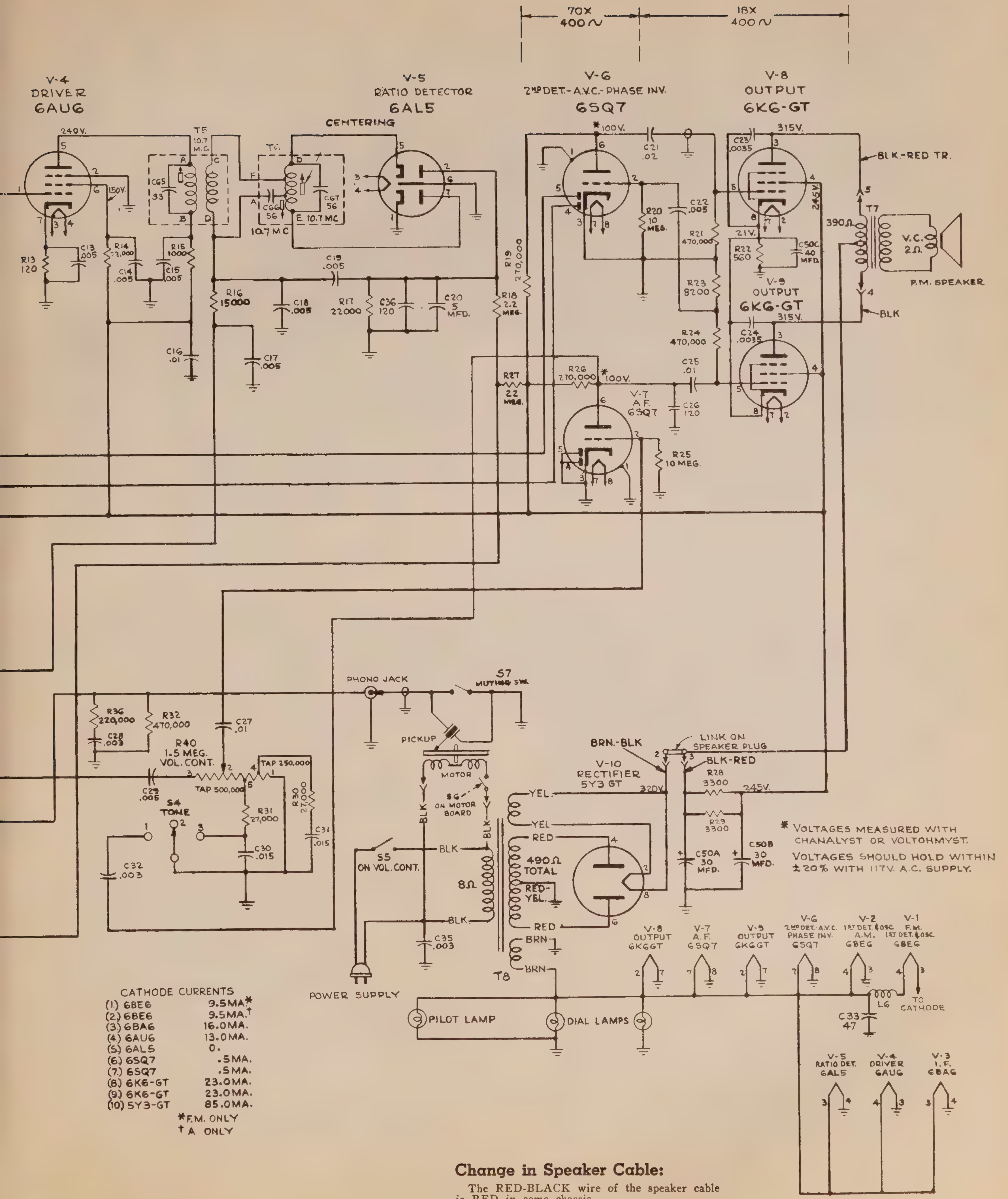

"A" ANT. TO GRID V2 2.5X (600KC.)
CONV. GAIN 28X (600-455KC.)
.65X 455KC
125X 455KC
.8X 455KC.
MEASURED WITH 3 VOLT FIXED BIAS
V-1
1ST DET. & OSC. F.M
6BE6
V-3
I. F.
6BA6
V-2
1ST DET. & OSC. A.M.
6BE6
L1
L2
C51 7-28
C52 3-35
R1 1 MEG.
F.M. ANT.
-4.0V (105MC)
-4.8V (90MC)
240V.
100V.
C1 27
R2 22,000
C53 7-19
C54 2.5-13.7
L3 F.M. OSC.
C2 330
R5 8200
C3 .01
R3 1000
R4 6800
T1
10.7 MC
C59 33
C60 33
T2
455KC
C61 110
C62 110
9.2 Ω
215V.
120V.
R8 47
R9 22,000
C11 .005
T3
10.7 MC
C64 33
T4
455 KC
7.5 Ω
C68 150
C69 150
C70 155
R10 2.2 MEG.
R11 270,000
C12 .005
R12 2200
245V.
R34 18,000
R6 22000
C5 .01
C6 .05
-3.5V (1500KC)
-10.0V (600KC)
R7 2.2 MEG.
R33 270,000
S45 S44 S43 S42 S41 S40
C45 100-540
C44 50-400
C43 50-400
C42 25-250
C41 25-250
C40 10-160
S15 S14 S13 S12 S11 S10
L15 L14 L13 L12 L11 L10
C7 120
C8 56
S3-REAR
S1-REAR
S2-REAR
C55 10-365 G
C34 1500
C10 47
C9 360
BLU.
GRN
BLK
LINK CLOSED FOR LOOP OPERATION
FM
A
G
RED
BLK
YEL
S3-FRONT
C56 12-502 G
C58 2-20
65Ω
L4 LOOP
F.M. ANTENNA
C57 4-70
4.4Ω
L5
"A" OSC.
S1-FRONT
S2-FRONT
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "PHONO" POSITION (MAX. C/CLOCKWISE POSITION)
"A" OSC. L5 COIL END VIEW
COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.

SCHEMATIC DIAGRAM—MODEL 610V2, (RC-610)

(Simplified schematic diagrams of band switch shown on following pages.)

MODELS 610V1, 610V2 (2nd PROD.)
Chassis No. RC-610C

The schematic diagram of RC-610C chassis is similar to that shown above, the major difference being in the ratio detector circuit the schematic diagram of which is shown on page 3, in addition C59 of T1 (1st I.F. FM) is omitted, R13 is 68 ohms, R14 is 33,000 ohms, R18 is 1.5 megohms and C36 is .005 mfd.


70X 400∿
18X 400∿
V-4 DRIVER 6AU6
V-5 RATIO DETECTOR 6AL5
CENTERING
V-6 2ND DET.-A.V.C.-PHASE INV. 6SQ7
V-8 OUTPUT 6K6-GT
V-9 OUTPUT 6K6-GT
V-7 A.F. 6SQ7
V-10 RECTIFIER 5Y3 GT
240V.
150V.
*100V.
315V.
245V.
21V.
320V.
T5 10.7 M.C.
T6
10.7MC
E 10.7MC
C65 33
C66 56
C67 56
R13 120
C13 .005
R14 22,000
C14 .005
R15 1000
C15 .005
C16 .01
R16 15000
C17 .005
C18 .005
C19 .005
R17 22000
C36 120
C20 5 MFD.
R18 2.2 MEG.
R19 270,000
C21 .02
R20 10 MEG.
C22 .005
R21 470,000
R23 8200
R24 470,000
C23 .0035
C24 .0035
R22 560
C50C 40 MFD.
390Ω
T7
V.C. 2Ω
P.M. SPEAKER
BLK-RED TR.
BLK
R27 22 MEG.
R26 270,000
C25 .01
C26 120
R25 10 MEG.
PHONO JACK
S7 MUTING SW.
PICKUP
MOTOR
S6 ON MOTOR BOARD
R36 220,000
C28 .003
R32 470,000
C27 .01
R40 1.5 MEG. VOL. CONT.
TAP 250,000
TAP 500,000
C29 .005
S4 TONE
R31 27,000
R30 27000
C30 .015
C31 .015
C32 .003
S5 ON VOL. CONT.
BLK
8Ω
490Ω TOTAL
YEL
RED
RED-YEL.
BRN
C35 .003
T8
POWER SUPPLY
BRN.-BLK
LINK ON SPEAKER PLUG
BLK-RED
R28 3300
R29 3300
C50A 30 MFD.
C50B 30 MFD.
PILOT LAMP
DIAL LAMPS
L6
TO CATHODE
C33 47
V-8 OUTPUT 6K6GT
V-7 A.F. 6SQ7
V-9 OUTPUT 6K6GT
V-6 2ND DET.-A.V.C. PHASE INV. 6SQ7
V-2 1ST DET. & OSC. A.M. 6BE6
V-1 F.M. 1ST DET. & OSC. 6BE6
V-5 RATIO DET. 6AL5
V-4 DRIVER 6AU6
V-3 I.F. 6BA6

CATHODE CURRENTS

(1.) 6BE6	9.5MA.*
(2.) 6BE6	9.5MA.†
(3.) 6BA6	16.0MA.
(4.) 6AU6	13.0MA.
(5.) 6AL5	0.
(6.) 6SQ7	.5MA.
(7.) 6SQ7	.5MA.
(8.) 6K6-GT	23.0MA.
(9.) 6K6-GT	23.0MA.
(10.) 5Y3-GT	85.0MA.

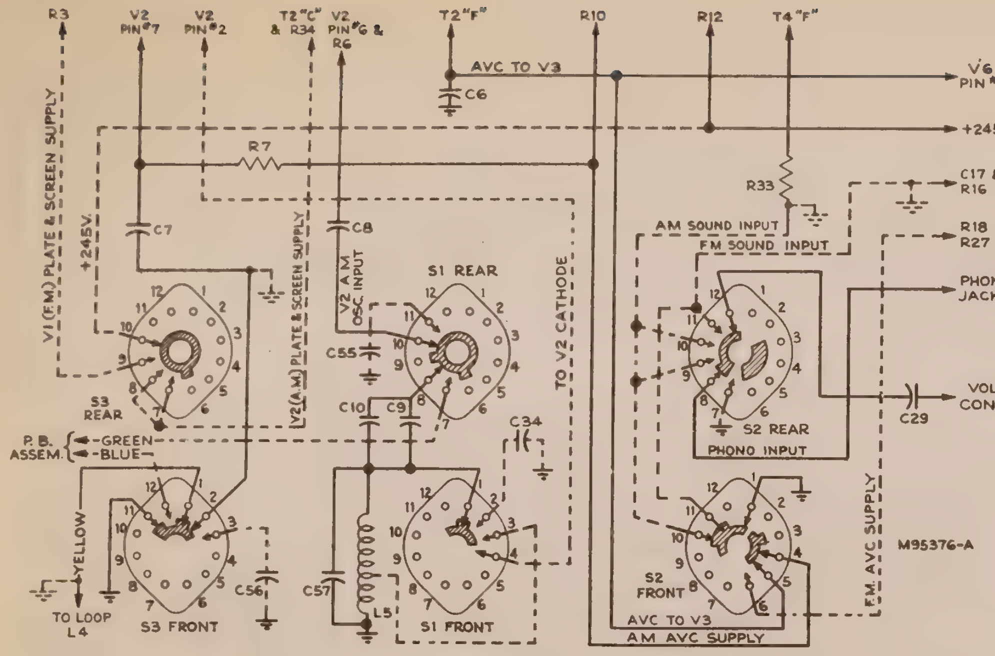
*F.M. ONLY
† A ONLY

* VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY.

Change in Speaker Cable:

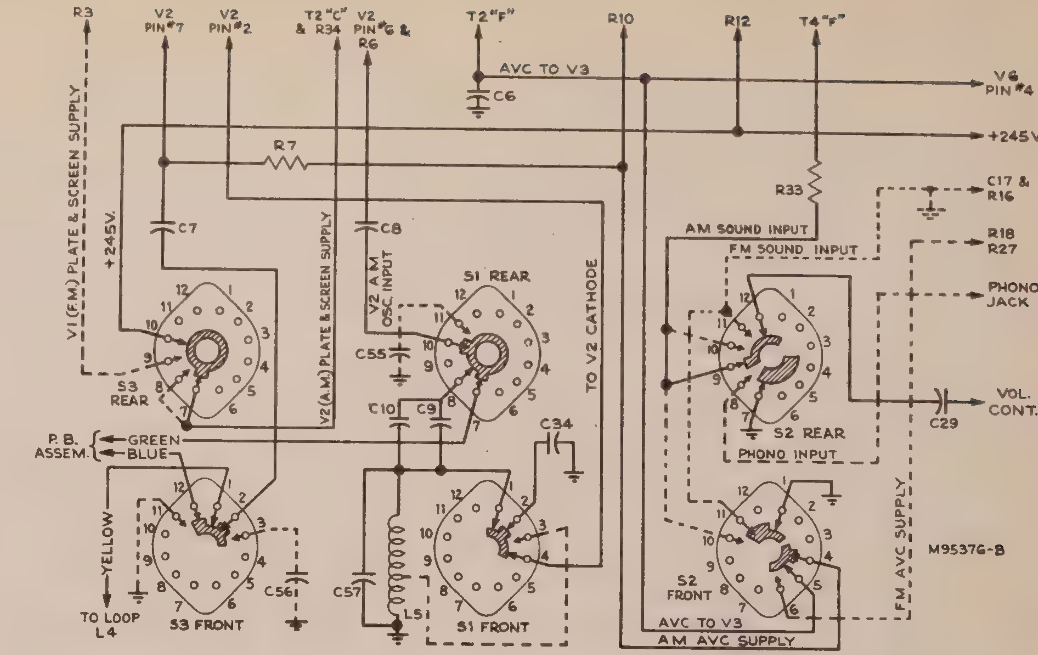
The RED-BLACK wire of the speaker cable is RED in some chassis.


R3
V2 PIN #7
V2 PIN #2
T2 "C" & R34
V2 PIN #G & R6
T2 "F"
R10
R12
T4 "F"
AVC TO V3
C6
V6 PIN #4
+245V
R7
R33
C17 & R16
R18 R27
PHONO JACK
VOL. CONT.
C29
AM SOUND INPUT
FM SOUND INPUT
PHONO INPUT
S2 REAR
S2 FRONT
S1 REAR
S1 FRONT
S3 REAR
S3 FRONT
C7
C8
C9
C10
C34
C55
C56
C57
L5
V1 (F.M.) PLATE & SCREEN SUPPLY
+245V.
V2 (A.M.) PLATE & SCREEN SUPPLY
V2 A.M. OSC INPUT
TO V2 CATHODE
P. B. ASSEM.
GREEN
BLUE
YELLOW
TO LOOP L4
AVC TO V3
AM AVC SUPPLY
F.M. AVC SUPPLY
M95376-A

PHONO

Simplified schematic diagram of band switch

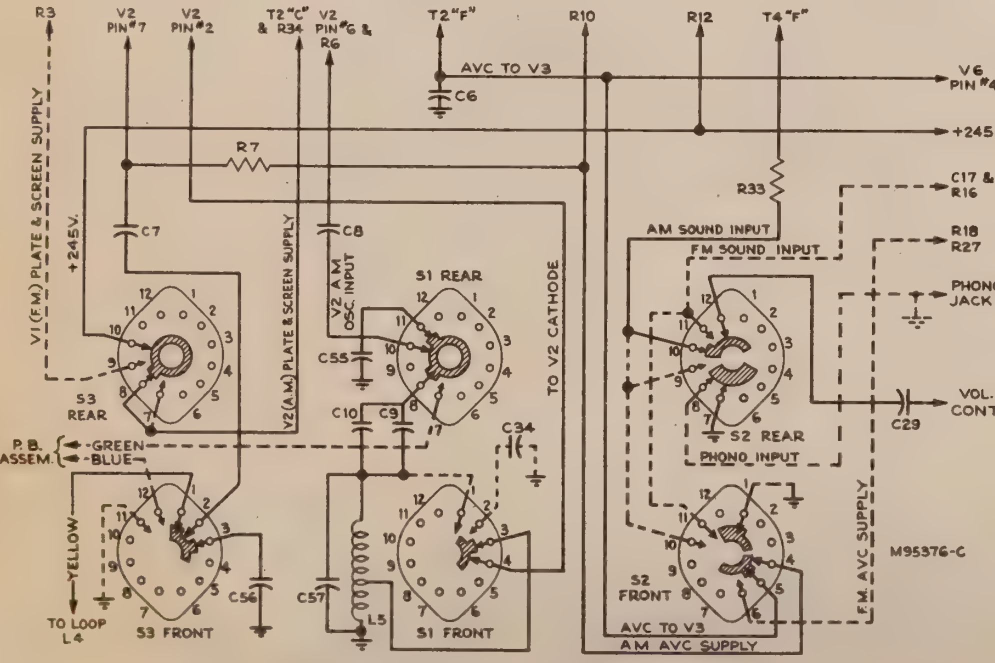
Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.


R3
V2 PIN #7
V2 PIN #2
T2 "C" & R34
V2 PIN #G & R6
T2 "F"
R10
R12
T4 "F"
AVC TO V3
C6
V6 PIN #4
+245V.
R7
R33
C17 & R16
R18 R27
PHONO JACK
VOL. CONT.
C29
AM SOUND INPUT
FM SOUND INPUT
PHONO INPUT
S2 REAR
S2 FRONT
S1 REAR
S1 FRONT
S3 REAR
S3 FRONT
C7
C8
C9
C10
C34
C55
C56
C57
L5
V1 (F.M.) PLATE & SCREEN SUPPLY
+245V.
V2 (A.M.) PLATE & SCREEN SUPPLY
V2 A.M. OSC INPUT
TO V2 CATHODE
P. B. ASSEM.
GREEN
BLUE
YELLOW
TO LOOP L4
AVC TO V3
AM AVC SUPPLY
F.M. AVC SUPPLY
M95376-B

PUSH BUTTON

Simplified schematic diagram of band switch

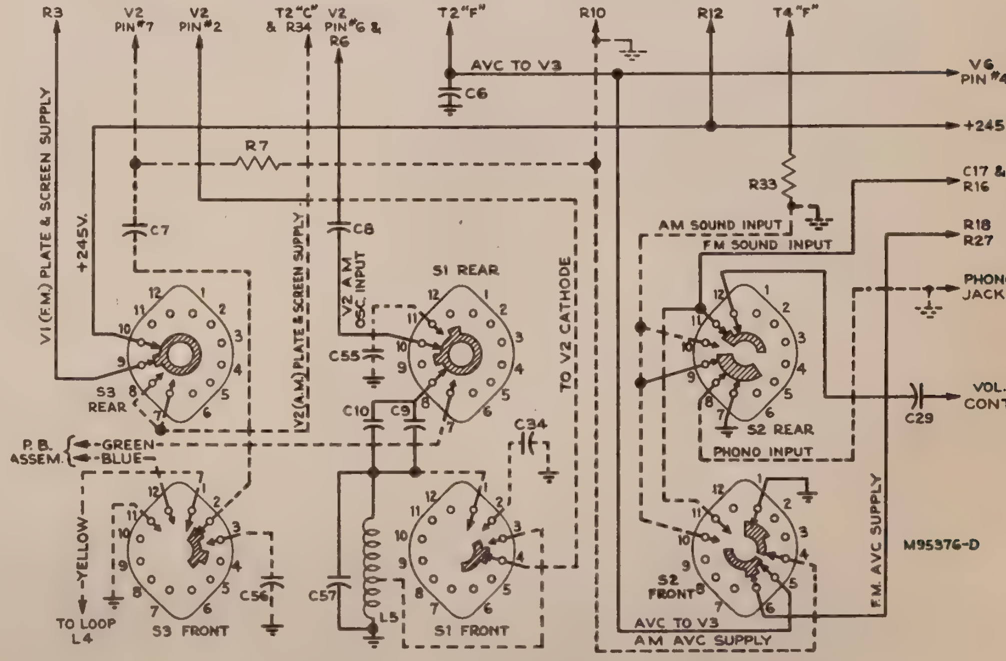
Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.


R3
V2 PIN #7
V2 PIN #2
T2 "C" & R34
V2 PIN #G & R6
T2 "F"
R10
R12
T4 "F"
AVC TO V3
C6
V6 PIN #4
+245V.
R7
R33
C17 & R16
R18 R27
PHONO JACK
VOL. CONT.
C29
AM SOUND INPUT
FM SOUND INPUT
PHONO INPUT
S2 REAR
S2 FRONT
S1 REAR
S1 FRONT
S3 REAR
S3 FRONT
C7
C8
C9
C10
C34
C55
C56
C57
L5
V1 (F.M.) PLATE & SCREEN SUPPLY
+245V.
V2 (A.M.) PLATE & SCREEN SUPPLY
V2 A.M. OSC INPUT
TO V2 CATHODE
P. B. ASSEM.
GREEN
BLUE
YELLOW
TO LOOP L4
AVC TO V3
AM AVC SUPPLY
F.M. AVC SUPPLY
M95376-C

DIAL TUNING (BC)

Simplified schematic diagram of band switch

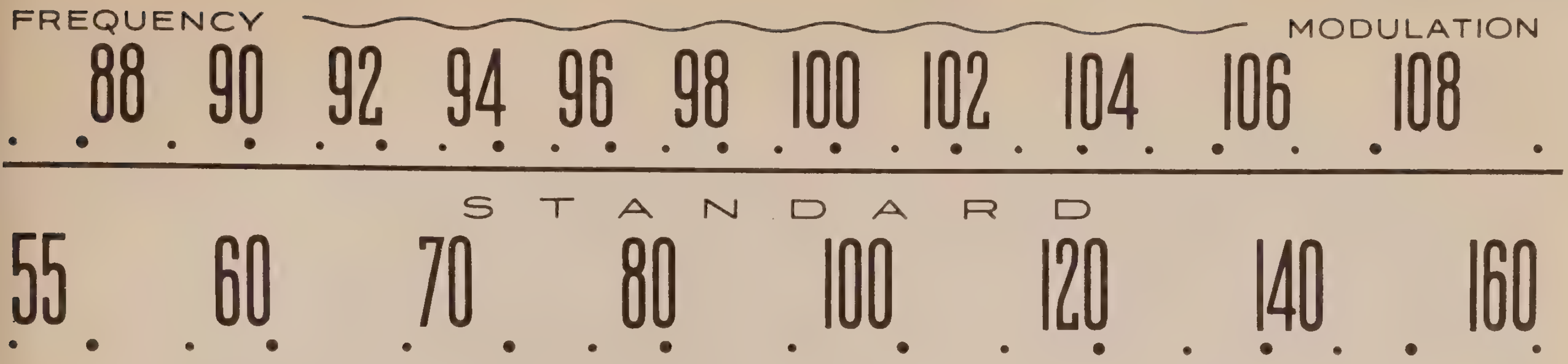
Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.


R3
V2 PIN #7
V2 PIN #2
T2 "C" & R34
V2 PIN #G & R6
T2 "F"
R10
R12
T4 "F"
AVC TO V3
C6
V6 PIN #4
+245V
R7
R33
C17 & R16
R18 R27
PHONO JACK
VOL. CONT.
C29
AM SOUND INPUT
FM SOUND INPUT
PHONO INPUT
S2 REAR
S2 FRONT
S1 REAR
S1 FRONT
S3 REAR
S3 FRONT
C7
C8
C9
C10
C34
C55
C56
C57
L5
V1 (F.M.) PLATE & SCREEN SUPPLY
+245V.
V2 (A.M.) PLATE & SCREEN SUPPLY
V2 A.M. OSC INPUT
TO V2 CATHODE
P. B. ASSEM.
GREEN
BLUE
YELLOW
TO LOOP L4
AVC TO V3
AM AVC SUPPLY
F.M. AVC SUPPLY
M95376-D

FM

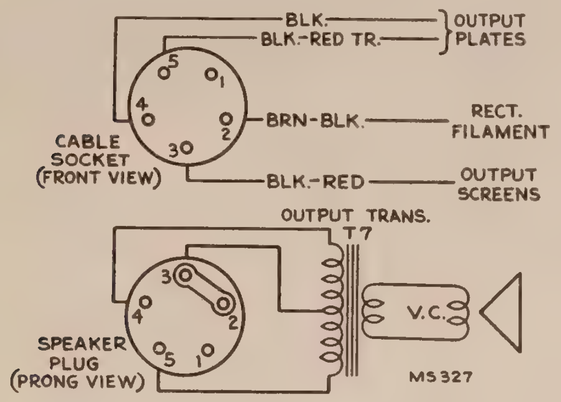
Simplified schematic diagram of band switch

Broken lines (- - -) indicate circuits not in use, some of which may be grounded (indicated by dashed ground symbols) through range switch contacts.

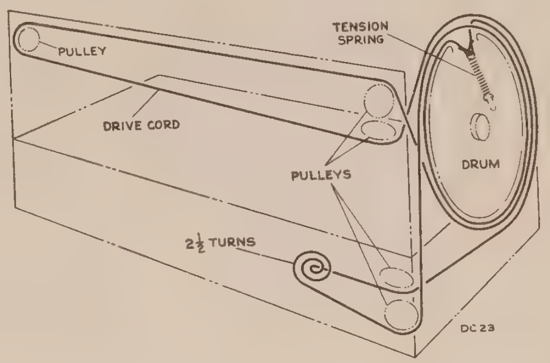


DIAL SCALE

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.



SPEAKER CONNECTIONS



DIAL INDICATOR AND DRIVE MECHANISM

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC-610**
72058	Board—"FM-Antenna-Ground" board
72046	Capacitor—Mica trimmer, 2.5-13 mmf. (C54)
71808	Capacitor—Mica trimmer, 3-35 mmf. (C52)
72334	Capacitor—Mica trimmer, 4-70 mmf. (C57)
72570	Capacitor—Ceramic, 27 mmf. (C1)
39042	Capacitor—Ceramic, 47 mmf. (C10, C33)
71924	Capacitor—Ceramic, 56 mmf. (C8)
71614	Capacitor—Ceramic, 120 mmf. (C7, C26, C36)
72571	Capacitor—Mica, 330 mmf. (C2)
72572	Capacitor—Mica, 360 mmf. (C9)
39656	Capacitor—Mica, 1500 mmf. (C34)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C23, C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28, C32)
71087	Capacitor—Molded paper, .003 mfd., 1000 volts (C35)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C17, C18, C19, C22, C29)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C11, C12, C13, C14, C15)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C30, C31)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C3, C5, C16, C25, C27)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C21)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C6)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C20)
72052	Capacitor—Electrolytic, consisting of 1 section of 30 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C50A, C50B, C50C)
72335	Coil—F.M. antenna coil (L1, L2)
72336	Coil—F.M. oscillator coil (L3)
72574	Coil—Filament choke coil (L6)
72333	Coil—Oscillator coil—"A" band (L5)
72059	Condenser—Variable tuning condenser less mounting bracket and trimmers (C51, C53, C55, C56)
70342	Control—Volume control and power switch (R40, S5)
34662	Cord—Drive cord (approx. 83" overall length)
	NOTE: Before assembling, stretch to full length.
71799	Grommet—Rubber grommet for mounting R.F. shelf (3 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate less dial
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
32641	Plug—3 prong male plug for selector cable or loop cable
36230	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R8)
30189	Resistor—120 ohms, ½ watt (R13)
44632	Resistor—560 ohms, 2 watts (R22)
34766	Resistor—1000 ohms, ½ watt (R3, R15)
71991	Resistor—2200 ohms, 1 watt (R12)
19525	Resistor—3300 ohms, 2 watts (R28, R29)
38887	Resistor—6800 ohms, 1 watt (R4)
14250	Resistor—8200 ohms, ½ watt (R23)
38888	Resistor—8200 ohms, 1 watt (R5)
36714	Resistor—15,000 ohms, ½ watt (R16)
39158	Resistor—18,000 ohms, 2 watts (R34)
30492	Resistor—22,000 ohms, ½ watt (R2, R6, R14, R17)
71989	Resistor—22,000 ohms, 1 watt (R9)
30409	Resistor—27,000 ohms, ½ watt (R30, R31)
14583	Resistor—220,000 ohms, ½ watt (R36)
30651	Resistor—270,000 ohms, ½ watt (R11, R19, R26, R33)
30648	Resistor—470,000 ohms, ½ watt (R21, R24, R32)
30652	Resistor—1 megohm, ½ watt (R1)
30649	Resistor—2.2 megohms, ½ watt (R7, R10, R18)
30992	Resistor—10 megohms, ½ watt (R20, R25)
71917	Resistor—22 megohms, ½ watt (R27)
72055	Shaft—Tuning knob shaft
35787	Socket—Phono input socket
31364	Socket—Lamp socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, octal
31418	Spring—Tension spring for drive cord
72056	Support—Dial support and pulley bracket complete with four pulleys—R.H.
72057	Support—Dial support and pulley bracket complete with one pulley—L.H.
72054	Switch—Range switch (S1, S2, S3)
71603	Switch—Tone switch (S4)
72593	Transformer—First I.F. transformer—F.M. (T1, C59, C60)
71625	Transformer—First I.F. transformer—A.M. (T2, C61, C62)
72723	Transformer—Second I.F. transformer—F.M. (T3, C64)
71631	Transformer—Second I.F. transformer—A.M. (T4, C68, C69, C70)
71935	Transformer—Driver transformer (T5, C65)
71934	Transformer—Ratio detector transformer (T6, C66, C67)
71975	Transformer—Power transformer, 117 volts, 50/60 cycle (T8)
35969	Washer—"C" washer for tuning shaft

(Replacement Parts continued

Replacement Parts (Continued)

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-610C
	Same as RC-610 except:
72571	Capacitor—Mica, 330 mmf. (C71, C72)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C36, C73)
34763	Resistor—68 ohms, ½ watt (R13)
34765	Resistor—100 ohms, ½ watt (R43)
30158	Resistor—820 ohms, ½ watt (R41)
12531	Resistor—910 ohms, ½ watt (R42)
3078	Resistor—10,000 ohms, ½ watt (R17)
30685	Resistor—33,000 ohms, ½ watt (R14)
31449	Resistor—1.5 megohms, ½ watt (R18)
72887	Transformer—1st I.F. transformer—F.M. (T1)
72888	Transformer—2nd I.F. transformer—F.M. (T3)
72889	Transformer—Ratio detector transformer (T5)
	Stock Nos. 71614—(120 mmf., C36), 72490 Capacitor, .005 mfd. (C19), 30189—(120 ohms, R13), 30492—(22,000 ohms, R14, R17), 30649—(2.2 meg., R18), 72593 Trans. (T1), 72723 Trans. (T3), 71935 Trans. (T5), 71934 Trans. (T6)—Not used in RC-610C.
	SPEAKER ASSEMBLIES
	92569-1W—RL103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T7)
	MISCELLANEOUS
72555	Antenna—Di-pole antenna
72750	Back—Cabinet back for walnut instruments
72751	Back—Cabinet back for mahogany instruments
72907	Back—Cabinet back for blonde instruments
72146	Bezel—Push button bezel—walnut or mahogany instruments
72906	Bezel—Push button bezel—blonde instruments
71599	Bracket—Pilot lamp bracket
70556	Bumper—Rubber bumper for tray—walnut or mahogany instruments
72908	Bumper—Rubber bumper for tray—blonde instruments
72144	Button—Push button
72583	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp cap
38684	Capacitor—Mica trimmer, 2-20 mmf. (C58)
36424	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf., 2 sections of 25-250 mmf., 2 sections of 50-400 mmf., and 1 section of 100-540 mmf. (C40, C41, C42, C43, C44, C45)
71892	Catch—Door catch
72157	Clip—Push button bezel spring clip
72050	Coil—P.B. oscillator coil—H.F. (L10, L11, L12)
72051	Coil—P.B. oscillator coil—L.F. (L13, L14, L15)
72558	Decal—Control marker decal—walnut or mahogany instruments
72910	Decal—Control marker decal—blonde instruments
71966	Decal—Trade mark decal (Victrola)
71984	Decal—Trade mark decal (RCA Victor)
72682	Dial—Glass dial scale
72513	Escutcheon—Dial escutcheon less dial
X1632	Grille—Grille cloth for walnut cabinet for Model 610V2
X1633	Grille—Grille cloth for mahogany cabinet for Model 610V2
X1649	Grille—Grille cloth for blonde cabinet for 610V2
X1643	Grille—Grille cloth for Model 610V1
72808	Grille—Metal grille for Model 610V1
72557	Grille—Metal grille for Model 610V2
72441	Guide—Carriage guide, R.H.—walnut or mahogany instruments
72904	Guide—Carriage guide, R.H.—blonde instruments
72442	Guide—Carriage guide, L.H.—walnut or mahogany instruments
72905	Guide—Carriage guide, L.H.—blonde instruments
39352	Hinge—Cabinet door hinge—walnut or mahogany instruments
72911	Hinge—Cabinet door hinge—blonde instruments
71821	Knob—Control knob—walnut or mahogany instruments
72800	Knob—Control knob—blonde instruments
72807	Knob—Record storage compartment door knob for Model 610V1
71890	Knob—Record storage compartment door knob for Model 610V2
11765	Lamp—Dial lamp—Mazda 51
70544	Loop—Antenna loop (L4, C58)
72563	Marker—Call letter marker
70546	Mounting—One set of hardware to mount record changer
30868	Plug—2 contact female plug for extension cable
30870	Plug—2 prong male plug for extension cable
31048	Plug—Pin plug for pickup cable
72556	Pull—Door pull for record changer compartment or radio compartment door for Model 610V2
72806	Pull—Door pull for record changer compartment or radio compartment door for Model 610V1
70551	Retainer—Tray roller retaining strip—L.H.
70552	Retainer—Tray roller retaining strip—R.H.
70554	Roller—Record changer tray roller (6 required)
36422	Socket—3 contact female socket for loop leads or for selector switch cable
72156	Spring—Push button bezel spring
34053	Spring—Push button retaining spring
30900	Spring—Retaining spring for knob
72582	Stop—Mechanism tray stop
39360	Support—Drop support for record changer compartment door—walnut or mahogany instruments
72912	Support—Drop support for record changer compartment door—blonde instruments
70545	Support—Loop support bracket (2 required)
72512	Switch—Push button switch only (S10, S11, S12, S13, S14, S15, S40, S41, S42, S43, S44, S45)
70555	Tire—Rubber tire for record changer tray roller
70553	Tray—Record changer tray—walnut or mahogany instruments
72909	Tray—Record changer tray—blonde instruments
2917	Washer—"C" washer to fasten rollers

For Automatic Record Changer Parts Refer to Service Data for RP-177 or 960001 Series

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

Substitute Speaker:

SPEAKER ASSEMBLIES

92569-1W2

13867	Cap—Dust cap
72828	Cone—Cone and voice coil assembly
71560	Plug—5-Prong male plug for speaker
71145	Suspension—Metal cone suspension
73242	Transformer—Output transformer

RCA VICTOR

AM-FM Radio Phonograph Combination
MODELS 612V1, 612V3, 612V4
RK-121 and RS-123 Chassis—Mfg. No. 274
SERVICE DATA
—1946 . . . No. 4—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

INTRODUCTION

The instrument consists of a twelve tube AM-FM radio designed to operate in the frequency bands indicated in the specifications.

In introducing this Deluxe Model into the FM field, it is important that the serviceman acquaints himself with the differences in this type of reception.

It is known that in some locations, particularly urban areas, a type of distortion peculiar to FM may be experienced.

This is in no way a fault of the receiver, but rather a physical phenomena caused by the signal being reflected from some object, resulting in two or more paths for the transmitted signal.

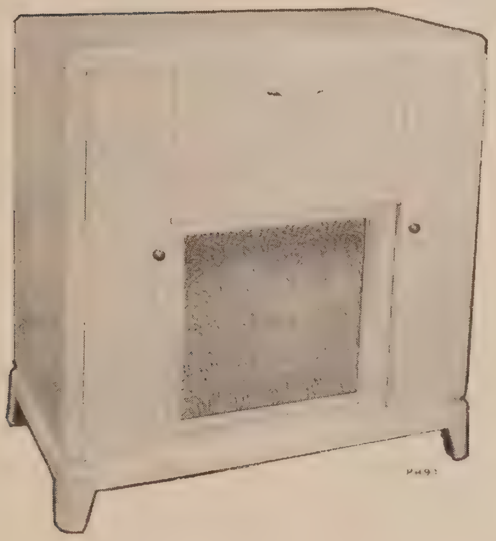
The reflected signal, arriving late and out of phase, tends to amplitude modulate the FM signal.

This distortion may appear as a strange buzz, rattle or swish. It may even give the effect of an overloaded audio stage. In other cases an increase in noise level may be noticed.

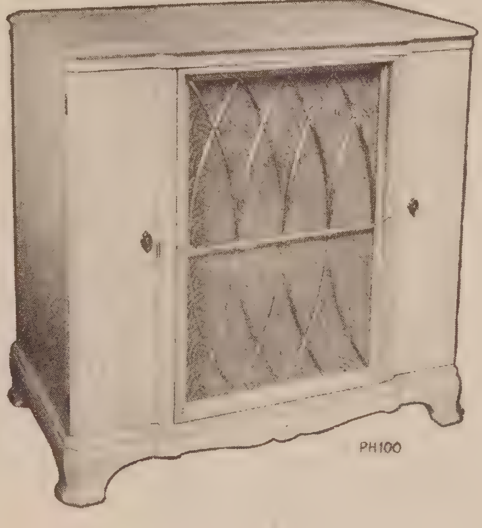
Choosing a different location for the receiver may eliminate the trouble since the directive folded dipole antenna housed in the cabinet will be directed differently.

In other severe cases an outside dipole and reflector pointing in the right direction may correct the trouble.

(See Antenna terminal board drawings page 11)



Model 612V1



Model 612V3

Model 612V4

Specifications

Frequency Range

Broadcast	540-1600 kc
Shortwave "C" Band	9.2-16.0 mc
Frequency Modulation	88-108 mc
Intermediate Frequency AM	455 kc
Intermediate Frequency FM	10.7 mc

Tube Complement of RK-121

1. RCA 6BA6	RF Amplifier
2. RCA 6BA6	Mixer
3. RCA 6BE6	Oscillator
4. RCA 6BA6	1st IF
5. RCA 6AU6	2nd IF and Phono. Amp.
6. RCA 6AU6	Driver
7. RCA 6AL5	Ratio Detector
8. RCA 6AT6	AM-DET-AVC-AF

Tube Complement of RS-123

1. RCA 5U4G	Rectifier
2. RCA 6J5	Phase Inverter
3. RCA 6F6G	Power Output
4. RCA 6F6G	Power Output
Undistorted Power Output	10 watts
Maximum Power Output	11 watts

Loudspeaker

Type	12 inch Electrodynamic
Voice coil impedance	2.2 ohms at 400 cycles
7—Pilot Lamps	No. 51
1—Pilot Lamp	No. 44

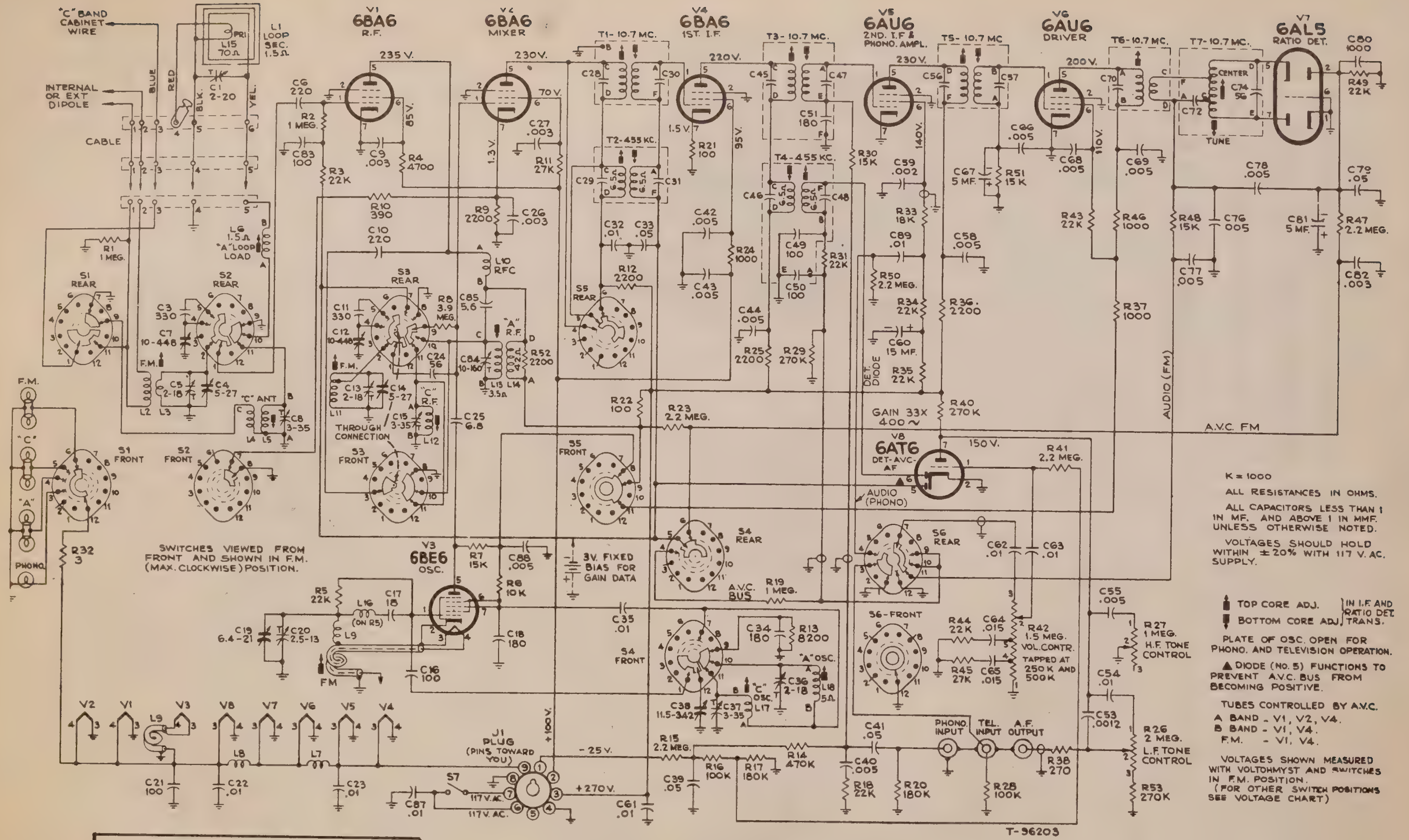
Overall Radio Chassis Dimensions

Height	17½"
Width	9"
Depth	6"
Tuning Drive Ratio	10 to 1
Total Power Consumption	Approx. 170 watts

For information on Record Changer refer to Service Data on RP176.

Models—612V1 Mahogany and Walnut	**RP176B**
—612V1 Blonde	**RP176A**
—612V3 Mahogany and Walnut	**RP176**
—612V3 Blonde	**RP176A**
—612V4 Mahogany and Walnut	**RP176**

NOTE:—The difference between the three record changers is in color of motor board parts only.


"C" BAND CABINET WIRE
INTERNAL OR EXT DIPOLE
CABLE
BLUE
RED
BLK.
YEL.
L1 LOOP SEC. 1.5Ω
L15 70Ω
PRI
C1 2-20
V1 6BA6 R.F.
V2 6BA6 MIXER
V4 6BA6 1ST. I.F.
V5 6AU6 2ND. I.F & PHONO. AMPL.
V6 6AU6 DRIVER
V7 6AL5 RATIO DET.
V8 6AT6 DET-AVC-AF
V3 6BE6 OSC.
T1- 10.7 MC.
T2-455 KC.
T3- 10.7 MC.
T4-455 KC.
T5- 10.7 MC
T6- 10.7 MC.
T7- 10.7 MC.
CENTER
TUNE
235 V.
230V.
220V.
230V.
200V.
150 V.
85V.
70 V.
1.3V.
1.5V.
95V.
140V.
110V.
C6 220
R2 1 MEG.
C83 100
R3 22K
C9 .003
R4 4700
C27 .003
R11 27K
R10 390
R9 2200
C26 .003
C10 220
L10 RFC
C85 5.6
R8 3.9 MEG.
C11 330
C12 10-448
C24 56
C84 10-160
"A" R.F.
R52 2200
L13 L14 3.5Ω
C13 2-18
C14 5-27
"C" R.F.
C15 3-35
L11
L12
C25 6.8
THROUGH CONNECTION
S3 REAR
S3 FRONT
F.M.
L6 1.5Ω "A" LOOP LOAD
R1 1 MEG.
S1 REAR
S2 REAR
C3 330
C7 10-448
C5 2-18
C4 5-27
L2 L3
"C" ANT
L4 L5
C8 3-35
S1 FRONT
S2 FRONT
F.M.
"C"
"A"
PHONO
R32 3
SWITCHES VIEWED FROM FRONT AND SHOWN IN F.M. (MAX. CLOCKWISE) POSITION.
C28
C30
C29
C31
C32 .01
C33 .05
R12 2200
S5 REAR
R21 100
C42 .005
R24 1000
C43 .005
C44 .005
R25 2200
R29 270K
C45
C47
C51 180
C46
C48
C49 100
C50 100
R31 22K
R30 15K
C59 .002
R33 18K
C89 .01
R50 2.2 MEG.
R34 22K
C60 15 MF.
R35 22K
DET. DIODE
R36 2200
C58 .005
R40 270K
GAIN 33X 400 ~
C56
C57
C66 .005
C67 5 MF.
R51 15K
C68 .005
R43 22K
R46 1000
R37 1000
C70
C69 .005
C72
C74 56
R48 15K
C76 005
C77 .005
C78 .005
C81 5 MF.
C79 .05
R47 2.2 MEG.
C80 1000
R49 22K
C82 .003
AUDIO (FM)
A.V.C. FM
R22 100
R23 2.2 MEG.
S5 FRONT
R41 2.2 MEG.
AUDIO (PHONO)
R7 15K
C88 .005
R6 10K
C18 180
3V. FIXED BIAS FOR GAIN DATA
R5 22K
L16 (ON R5)
C17 18
C19 6.4-21
C20 2.5-13
L9
FM
C16 100
C35 .01
S4 REAR
A.V.C. BUS
R19 1 MEG.
S4 FRONT
C34 180
R13 8200
"A" OSC.
"C" OSC
L17
C36 2-18
L18 5Ω
C38 11.5-342
C37 3-35
S6 REAR
C62 .01
C63 .01
S6-FRONT
R44 22K
C64 .015
R42 1.5 MEG. VOL. CONTR. TAPPED AT 250K AND 500K
R45 27K
C65 .015
C55 .005
R27 1 MEG. H.F. TONE CONTROL
C54 .01
C53 .0012
R26 2 MEG. L.F. TONE CONTROL
R53 270K
V2 V1 L9 V3 V8 V7 V6 V5 V4
L8
L7
C21 100
C22 .01
C23 .01
J1 PLUG (PINS TOWARD YOU)
+100 V.
-25 V.
+270 V.
S7
117 V. AC.
117 V. AC.
C87 .01
C61 .01
R15 2.2 MEG.
C39 .05
R16 100K
R17 180K
R14 470K
C41 .05
C40 .005
R18 22K
R20 180K
PHONO. INPUT
TEL. INPUT
A.F. OUTPUT
R28 100K
R38 270
T-96203
K = 1000
ALL RESISTANCES IN OHMS.
ALL CAPACITORS LESS THAN 1 IN MF. AND ABOVE 1 IN MMF. UNLESS OTHERWISE NOTED.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.
TOP CORE ADJ.
BOTTOM CORE ADJ.
IN I.F. AND RATIO DET. TRANS.
PLATE OF OSC. OPEN FOR PHONO. AND TELEVISION OPERATION.
▲ DIODE (NO. 5) FUNCTIONS TO PREVENT A.V.C. BUS FROM BECOMING POSITIVE.
TUBES CONTROLLED BY A.V.C.
A BAND - V1, V2, V4.
B BAND - V1, V4.
F.M. - V1, V4.
VOLTAGES SHOWN MEASURED WITH VOLTOHMYST AND SWITCHES IN F.M. POSITION. (FOR OTHER SWITCH POSITIONS SEE VOLTAGE CHART)

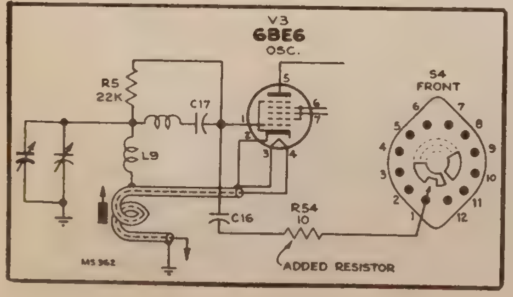
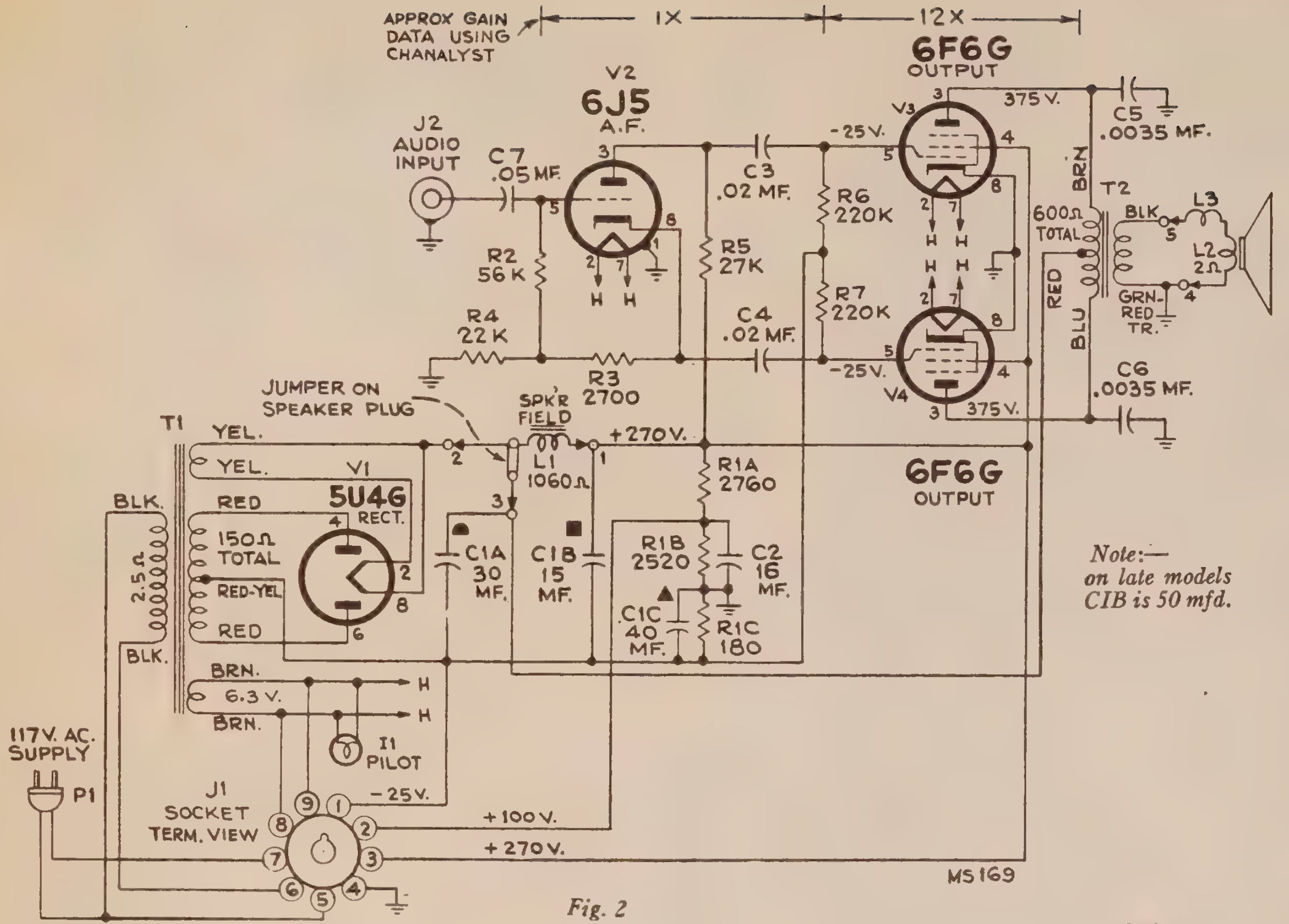

V3 6BE6 OSC.
R5 22K
C17
L9
C16
R54 10
ADDED RESISTOR
S4 FRONT
M5362

Fig. 1. Complete schematic for Radio Chassis—Range Switch shown in FM position. For separate schematic of range switch positions see figures 11, 12 and 14. See fig. 2 for power amplifier. Gain data found on A band schematic Fig. 11.

NOTE:—On some instruments C40 is .01 mfd. On later instruments starting with the Serial No. 25,000 an additional 10 ohm carbon resistor is added between C16 (100 mmf.) and terminal No. 1 of S4 front. The purpose of this resistor is to eliminate dead spots between 1400 to 1600 kc on "A" band. The resistor should be added to any early model set developing that trouble, but in so doing make certain the overall lead length including the resistor remains the same as before.


APPROX GAIN DATA USING CHANALYST
1X
12X
J2 AUDIO INPUT
C7 .05 MF.
V2 6J5 A.F.
R2 56 K
R4 22 K
R3 2700
C3 .02 MF.
R5 27K
C4 .02 MF.
R6 220K
R7 220K
-25V.
V3 6F6G OUTPUT
V4 6F6G OUTPUT
375 V.
C5 .0035 MF.
C6 .0035 MF.
T2
BRN
RED
BLU
600Ω TOTAL
BLK
GRN-RED TR.
L3
L2 2Ω
JUMPER ON SPEAKER PLUG
SPK'R FIELD
L1 1060Ω
+270V.
R1A 2760
R1B 2520
R1C 180
C1A 30 MF.
C1B 15 MF.
C1C 40 MF.
C2 16 MF.
T1
YEL.
RED
BLK.
2.5Ω
V1 5U4G RECT.
150Ω TOTAL
RED-YEL
BRN.
6.3 V.
H
I1 PILOT
117V. AC. SUPPLY
P1
J1 SOCKET TERM. VIEW
-25V.
+100 V.
+270 V.
MS169

Note:— on late models C1B is 50 mfd.

Fig. 2

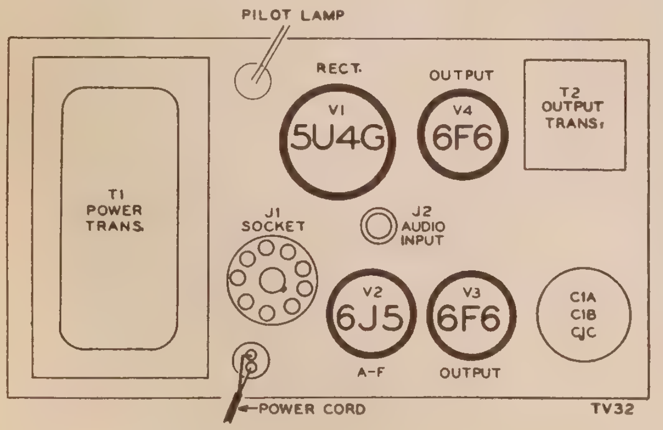

PILOT LAMP
RECT.
V1 5U4G
OUTPUT
V4 6F6
T2 OUTPUT TRANS.
T1 POWER TRANS.
J1 SOCKET
J2 AUDIO INPUT
V2 6J5
A-F
V3 6F6
OUTPUT
C1A C1B C1C
POWER CORD
TV32

Fig. 3

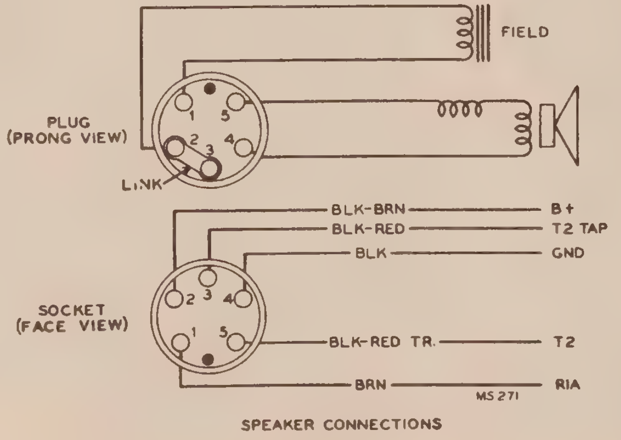

FIELD
PLUG (PRONG VIEW)
LINK
SOCKET (FACE VIEW)
BLK-BRN
BLK-RED
BLK
BLK-RED TR.
BRN
B+
T2 TAP
GND
T2
R1A
MS271
SPEAKER CONNECTIONS

Fig. 4

RADIO CHASSIS UNIT RK121 VOLTAGE CHART

Tube	Type		Pin #	Phono.	B.C.	S.W.	F.M.
V1	6BA6	Plate	5	260	225	220	235
		SCG	6	95	110	90	85
V2	6BA6	Plate	5	260	255	240	230
		SCG	6	90	100	70	70
		Cathode	7	6	6.5	1.8	1.3
V3	6BE6	Plate	5	0	160	155	140
		Grids 2-3-4	6, 7	0	155	160	140
		Grid 1	1		−5.2 (1600 KC)	−10.5 (9.5 MC)	−6.6 (108 MC)
		Grid 1	1	..	−2.7 (550 KC)	−15.5 (16.2 MC)	−6 (100 MC)
		Grid 1	1	..	...	...	−9 (88 MC)
V4	6BA6	Plate	5	245	250	230	220
		SCG	6	110	120	105	95
		Cathode	7	1.4	1.2	1.4	1.5
V5	6AU6	Plate	5	255	245	240	230
		SCG	6	145	140	140	140
V6	6AU6	Plate	5	0	0	0	200
		SCG	6	0	0	0	110
V7	6AL5	...	...	...	...	...	...
V8	6AT6	Plate	7	150	150	150	150

AMPLIFIER UNIT RS123 VOLTAGE CHART

V2	6J5	Plate	3	230	...	...	...
		Cathode	8	36	...	...	...
V3	6F6G	Plate	3	375	...	...	...
		SCG	4	270	...	...	...
		Grid	5	− 25	...	...	...
V4	6F6G	Same as V3			...	...	...
"B" Voltage Measured from Rectifier Fil. (5U4G) to Gnd. 380V.							

Voltages were measured with Voltohmyst with the Radio Chassis RK121 connected.

All voltages are measured in respect to ground.

Cathode Currents with Band Switch in FM Position			
V1	RF. Amp.	14 ma.	V7 Ratio Det.
V2	Mixer	4.7 ma.	V8 Det.-Avc.-AF
V3	Osc.	15.9 ma.	Power amp. RS123
V4	First IF.	12.4 ma.	V1 Rectifier Total 140 ma.
V5	2nd IF.-Phono. Amp.	5.6 ma.	V2 Phase Inverter 2.15 ma.
V6	Driver FM	13.7 ma.	V3, V4 Power output 27 ma.

ALIGNMENT PROCEDURE

Before aligning set, completely mesh the gang and set the dial pointer on the mechanical maximum calibration point at the extreme left hand end of the dial.

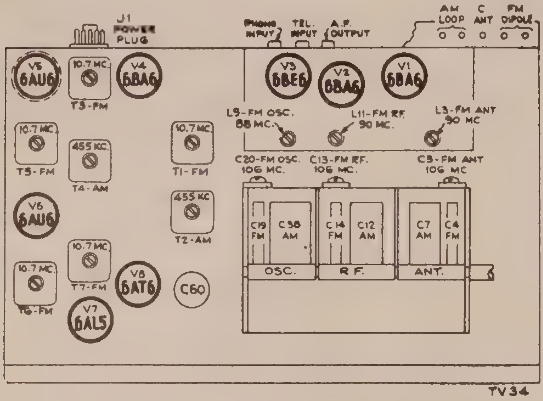
When making a complete alignment follow in proper sequence the tabulated form below.

If only a portion of the circuit is to be aligned select the portion required, followed by the remaining steps in the chart. Any adjustments made on the FM 10.7 mc. IF's make it necessary to realign the AM 455 kc. IF's.

For "A" and "C" band alignment use output meter across voice coil keeping Test Oscillator output as low as possible to prevent AVC action.

Equipment Required for Alignment

Electronic Voltmeter (VoltOhmyst)
Output meter
Test Osc. AM
680 ohm Resistor }
150 ohm Resistor } Carbon
120 ohm Resistor }
Two 68,000 ohm Resistors within 1% of each other (Carbon)
200 mmf. Capacitor
20-30 mmf. Capacitor
.01 mfd. Capacitor



J1 POWER PLUG
PHONO INPUT
TEL. INPUT
A.F. OUTPUT
AM LOOP
C ANT
FM DIPOLE
V5 6AU6
10.7 MC.
T3-FM
V4 6BA6
V3 6BE6
V2 6BA6
V1 6BA6
L9-FM OSC. 88 MC.
L11-FM RF. 90 MC.
L3-FM ANT 90 MC
10.7 MC.
T5-FM
455 KC.
T4-AM
10.7 MC.
T1-FM
C20-FM OSC. 106 MC.
C13-FM RF. 106 MC.
C5-FM ANT 106 MC
455 KC
T2-AM
V6 6AU6
C19 FM
C38 AM
C14 FM
C12 AM
C7 AM
C4 FM
OSC.
R F.
ANT.
10.7 MC
T7-FM
10.7 MC.
T6-FM
V8 6AT6
C60
V7 6AL5
TV34

Fig. 5.

FM RATIO DETECTOR ALIGNMENT

SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Test Osc. To—	Tune the Osc. To—	Turn Vol. Cont. To—	Adjust
1.	Connect a 680 ohm Resistor between lugs D and E of the ratio detector transformer T7. Connect DC probe of a voltohmyst to the negative lead of the 5 mfd. Electrolytic capacitor C81. The common lead of the meter to chassis.			
2.	Driver grid pin 1, of 6AU6 (V6) in series with a .01 MFD capacitor.	10.7 MC 30% Mod. 400 Cycles AM	Maximum Volume	Driver transformer T6 for maximum DC voltage across C-81
3.	Remove Meter Leads and disconnect the 680 ohm resistor from D and E on T7. Connect two 68,000 ohm resistors (within 1% of each other) in series, across C81. Connect the common lead of the Voltohmyst to the center point of the 68,000 ohm resistors and the DC probe to contact No. 7 on rear of Switch wafer S6. Use the 30 volt scale.			
4.	Same as Step 2	Same as Step 2	Volume Control Maximum	†T7 Bottom core for Zero DC Balance on Voltohmyst ††T7 top core for minimum audio output. (Output meter across voice coil)
5.	Reconnect voltohmyst as in step 1, omitting the 680 ohm resistor.			
6.	Repeat step 2 omitting 680 ohms.			
7.	Remove all connections.			

†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

††The zero DC balance and the minimum AF output should occur at the same point: if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the voltohmyst, and an output meter connected across the voice coil for the point at which both zero DC and minimum output occurs.

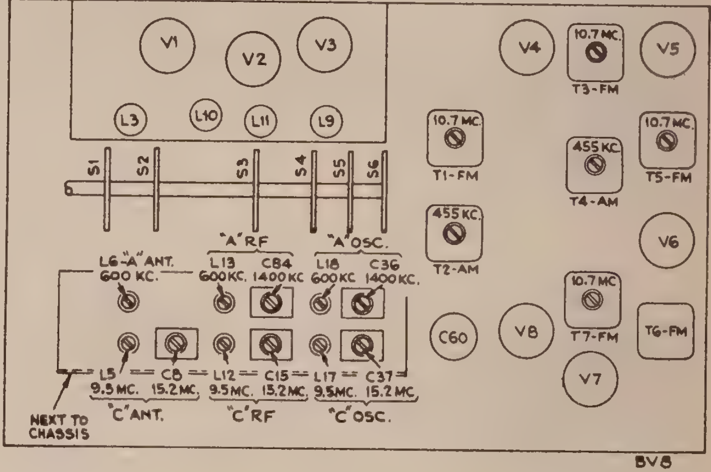
Note:—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum AF and minimum DC is reached.

CRITICAL LEAD DRESS

(Make lead dress before alignment)

1. Lead from pin 5, tube V2, to terminal "C" on transformer T1 should be dressed close to chassis.
2. Leads to terminals "C" and "D" on transformer T2 should be dressed close together.
3. The following capacitors must be dressed close to the chassis with leads kept as short as possible: C32, C33, C66, C69, C79, and C80.
4. All FM coil connections must be soldered in exact place as the original. (One-sixteenth inch difference in length may be excessive).
5. Lead from pin 7, tube V8, must be dressed away from lead to terminal "D" of transformer T7.
6. ALL wiring in the receiver is critical as to length and placement. It is therefore important when servicing, that extreme care should be taken so as not to disturb more of the wiring than absolutely necessary.

Note: Keep tuning capacitor rotor grounding brushes clean and making good contact.



V1
V2
V3
L3
L10
L11
L9
S1
S2
S3
S4
S5
S6
V4
10.7 MC.
T3-FM
V5
10.7 MC.
T1-FM
455 KC.
T4-AM
10.7 MC.
T5-FM
455 KC.
T2-AM
V6
"A" RF
"A" OSC.
L6-"A" ANT. 600 KC.
L13 600KC.
C84 1400KC
L18 600KC
C36 1400KC.
10.7 MC
T7-FM
T6-FM
C60
V8
V7
L5 9.5 MC.
C8 15.2 MC.
L12 9.5 MC.
C15 15.2 MC.
L17 9.5 MC.
C37 15.2 MC
NEXT TO CHASSIS
"C" ANT.
"C" RF
"C" OSC.
BV8

Fig. 6

ANT.—RF.—IF. ALIGNMENT

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
	"FM" IF Alignment				
1.	Connect the DC probe of a voltohmyst to the negative lead of the 5 MFD electrolytic capacitor C 81, and the common lead of the meter to chassis ground				
2.	Mixer grid pin #1 of 6BA6, (V2) in series with a .01 MFD capacitor (Adjust test osc. output for 6-10 volts developed across C81) (Range switch in FM position) (Use very short lead)	To RF Tube shelf ground near mixer tube (use very short leads)	10.7 MC 30% modulated at 400 cycles AM.	Max. cap. (Fully meshed)	*T5, T3, T1 top and bottom cores alternately loading primary & secondary of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C81.
	"AM" IF Alignment				
3.	Mixer grid pin #1 of (V2) in series with a .01 MFD Capacitor. (Turn band switch to "A" or "C" band)	To chassis ground	455KC	High Freq. end of Dial	**Top and bottom Cores of T2 and T4. (For maximum voltage across voice coil)

ANT—RF—IF—ALIGNMENT (Continued)

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust

"C" Band OSC.—RF.—ANT. Alignment

4.	"C" Band Ant. Terminal #3 Through a dummy Ant. comprising a 150 ohm resistor in series with a 25 to 30 mmf capacitor	To Chassis ground	15.5 MC	15.5 MC	Osc.—C37*** RF.—C15 Ant.—C8 (For maximum voltage across voice coil)
5.			9.5 MC	9.5 MC	Osc.—L17*** RF—L12 Ant.—L5 (For maximum voltage across voice coil)
6.	Repeat steps 4 and 5 for accurate alignment				

"A" Band OSC.—RF.—ANT.

7.	High Side (Red Lead) of Loop Primary with link open through a Dummy Ant. comprising a 200 mmf. Capacitor	To Chassis ground	1400 KC	1400 KC	Osc.—C36 RF.—C84 Ant.—C1 (For maximum voltage across voice coil)
8.			600 KC	600 KC	Osc.—L18 RF—L13 Ant.—L6 (For maximum voltage across voice coil)
9.	Repeat steps 7 and 8 for Max. output.				

"FM" Band OSC.—RF.—ANT. Alignment

10.	FM antenna terminal #1 in series with a 120 ohm resistor	To FM antenna terminal #2 in series with a 120 ohm resistor	106 MC	106 MC	Osc.—C20 for maximum voltage across C81.
11.			88 MC	88 MC	**** Osc.—L9 for maximum voltage across C81.
12.	Repeat steps 10 and 11 for exact calibration.				
13.	Remove or turn test oscillator off.			106 MC No Carrier	***** RF, C13 for maximum voltage across C81 (Noise Voltage)
14.				90 MC No Carrier	**** RF, L11 for maximum voltage across C81. (Noise Voltage)
15.	Repeat steps 13 and 14 for maximum output.				
16.	Same as step 10	Same as step 10	106 MC	106 MC	Ant. C5 for maximum voltage across C81.
17.	Same as step 10	Same as step 10	90 MC	90 MC	Ant. L3 for maximum voltage across C81.
18.	Repeat steps 16 and 17 for maximum output.				
19.	Disconnect dummy antenna and adjust Ant. trimmer C1 on loop when set is installed in cabinet.				

*This method is known as alternate loading which involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680 ohm resistor while the plate winding is being peaked.

When the windings are loaded, it is necessary to increase the 10.7 MC input since the gain will decrease and the voltage across C81 will be less.

**It is necessary to alternately load the primary and secondary of each 455 KC I. F. transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

***To guard against the possibility of alignment of L17 and C37 to image frequencies, tune the test oscillator to 15.5 MC and turn the radio dial to 15.5 MC. Then adjust the test oscillator to 16.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 MC and turn the radio dial to 9.5 MC, then adjust the test oscilliator to 10.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard.

(If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 4 and 5)).

****Two points may be found to fulfill the requirements. Use the one with the longest threaded end extending out of the transformer.

*****Two points can be found having the greatest noise voltage developed. Use the one with the greater capacity (tighter adjustment).

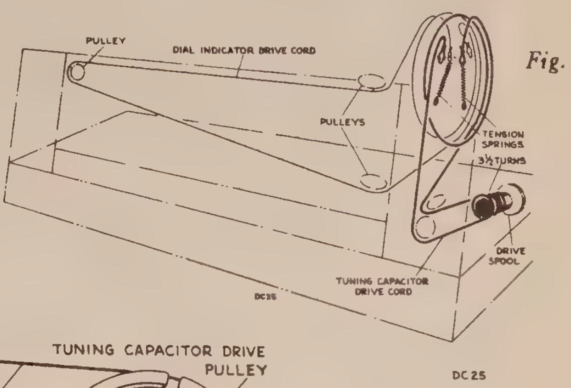
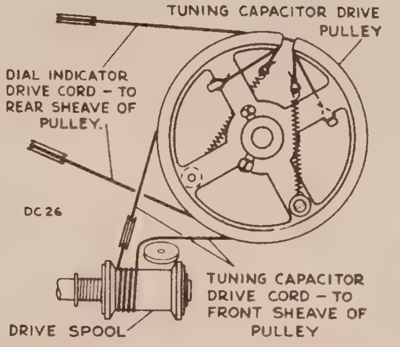

PULLEY
DIAL INDICATOR DRIVE CORD
PULLEYS
TENSION SPRINGS
3½ TURNS
DRIVE SPOOL
TUNING CAPACITOR DRIVE CORD
DC26
DC25

Fig. 7


TUNING CAPACITOR DRIVE PULLEY
DIAL INDICATOR DRIVE CORD - TO REAR SHEAVE OF PULLEY.
DC 26
TUNING CAPACITOR DRIVE CORD - TO FRONT SHEAVE OF PULLEY
DRIVE SPOOL

END VIEW OF DRIVE MECHANISM SHOWN WITH TUNING CAPACITOR AT MAX. CAPACITY.

Fig. 8

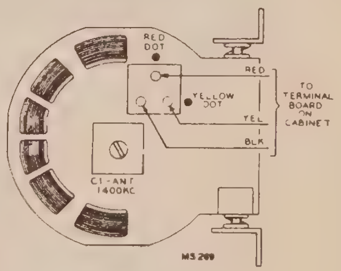

RED DOT
RED
YELLOW DOT
YEL
BLK
TO TERMINAL BOARD ON CABINET
C1-ANT 1400KC
MS 209

Fig. 9
Loop antenna

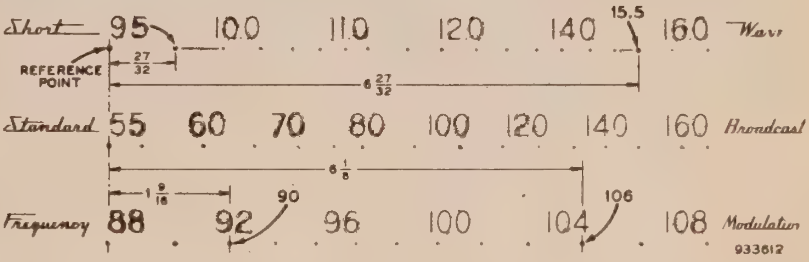

Short
95
10.0
11.0
12.0
14.0
15.5
16.0
Wave
REFERENCE POINT
27/32
6 27/32
Standard
55
60
70
80
100
120
140
160
Broadcast
6 1/8
1 9/16
90
106
Frequency
88
92
96
100
104
108
Modulation
933612

Fig. 10
Dial scale drawing

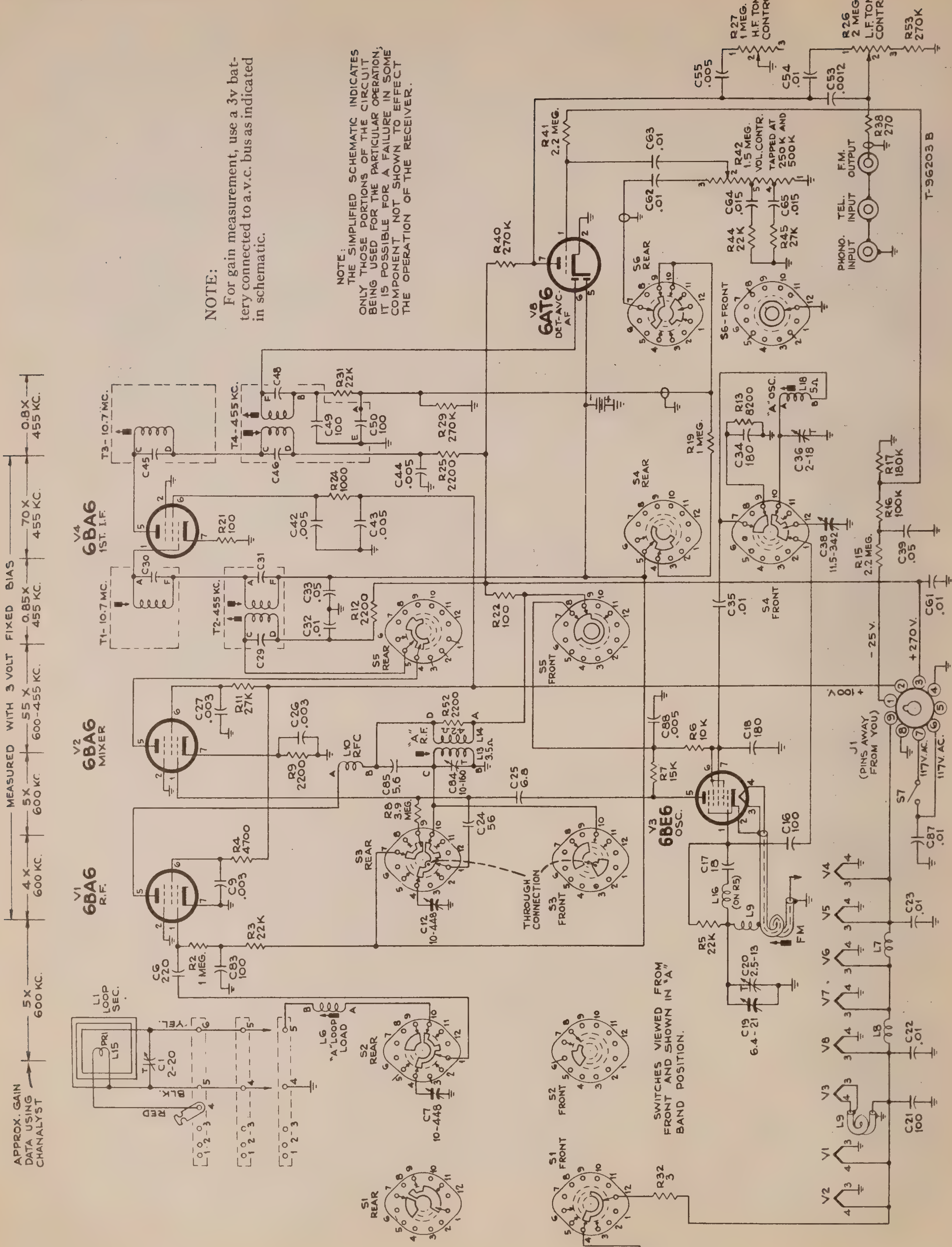
Circuit diagram breakdown description

In order to have the instrument function in all of the positions of the band switch, a number of extra tubes and parts are required. We have attempted to simplify the circuits by including simplified schematics showing only the parts actually required for the instrument to operate in the position to which the switch is turned.

It can be noted by examining the different simplified schematics, that a few of the circuits deviate from the conventional form.

Tube V8 performs the function of 2nd Det., AVC and AF amp. in "A" and "C" bands only. Diode #5 of V8 functions as a device to prevent the AVC bus from becoming positive.

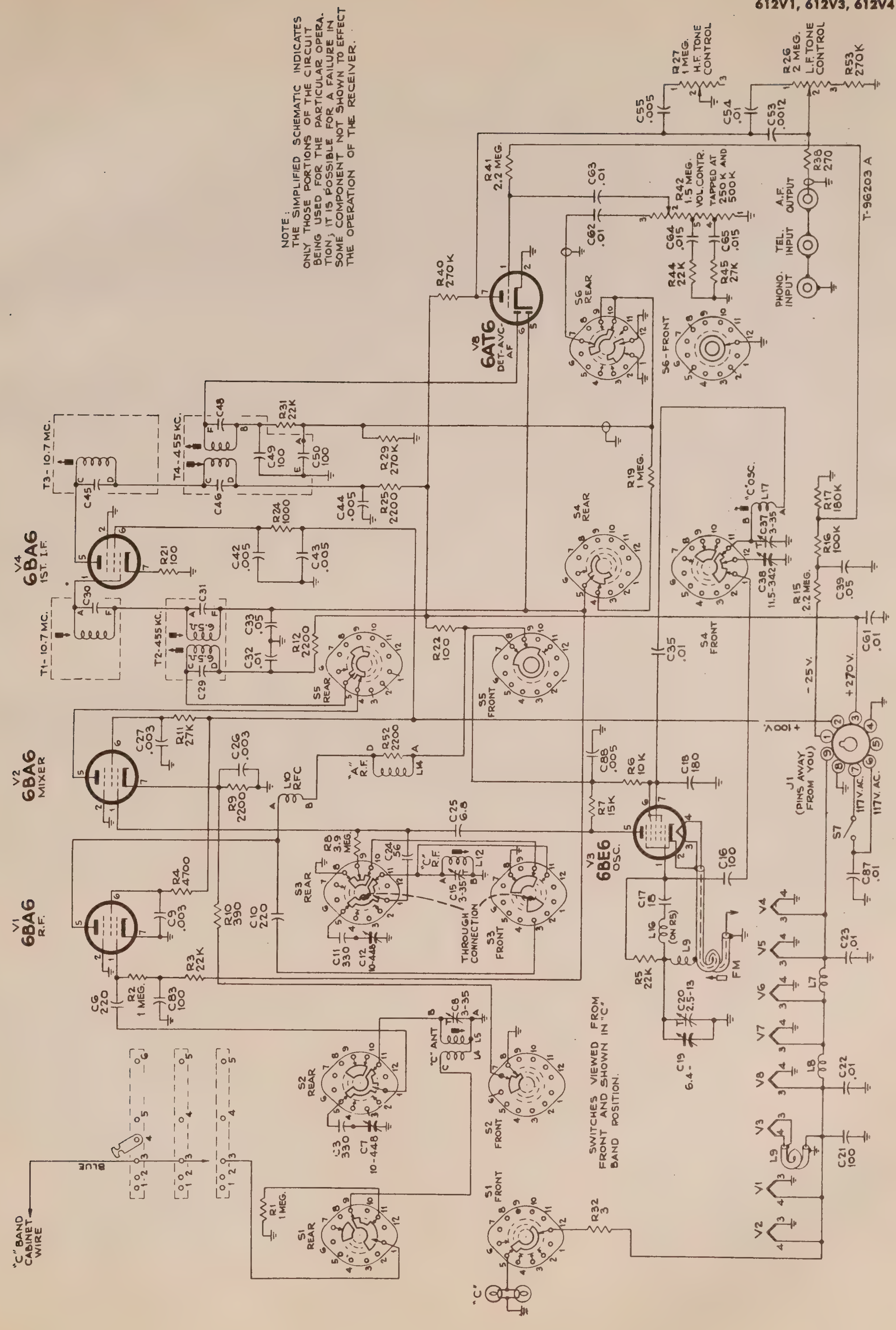
Tubes V6 and V7 are used only in the FM positions; V6 as a driver and V7 as an FM demodulator as described under the heading of Ratio Detector. (See page 14)


APPROX. GAIN DATA USING CHANALYST
5 X 600 KC.
4 X 600 KC.
5 X 600 KC
55 X 600-455 KC.
0.85 X 455 KC.
70 X 455 KC.
0.8 X 455 KC.
MEASURED WITH 3 VOLT FIXED BIAS
V1 6BA6 R.F.
V2 6BA6 MIXER
V4 6BA6 1ST. I.F.
V8 6AT6 DET.-AVC.-AF
V3 6BE6 OSC.
L1 LOOP SEC.
PRI L15
C1 2-20
RED
BLK.
YEL.
LG "A" LOOP LOAD
C7 10-448
S1 REAR
S1 FRONT
S2 REAR
S2 FRONT
S3 REAR
S3 FRONT
S4 REAR
S4 FRONT
S5 REAR
S5 FRONT
S6 REAR
S6-FRONT
THROUGH CONNECTION
C6 220
R2 1 MEG.
C83 100
R3 22K
C9 .003
R4 4700
C12 10-448
R8 3.9 MEG.
C24 56
C84 10-160
C85 5.6
L10 RFC
R9 2200
C26 .003
"A" R.F.
L14 4.2Ω
L13 3.5Ω
R52 2200
C25 6.8
C27 .003
R11 27K
T1-10.7 MC.
T2-455 KC.
C29
C30
C31
C32 .01
C33 .05
R12 2200
R21 100
C42 .005
C43 .005
R24 1000
C44 .005
R25 2200
T3-10.7 MC.
C45
T4-455 KC.
C46
C49 100
C50 100
C48
R31 22K
R29 270K
R22 100
R19 1 MEG.
R40 270K
R41 2.2 MEG.
C63 .01
C62 .01
R42 1.5 MEG. VOL. CONTR. TAPPED AT 250K AND 500K
C64 .015
C65 .015
R44 22K
R45 27K
C55 .005
R27 1 MEG. H.F. TONE CONTROL
C54 .01
C53 .0012
R26 2 MEG. L.F. TONE CONTROL
R53 270K
R38 270
PHONO. INPUT
TEL. INPUT
F.M. OUTPUT
T-96203 B
R13 8200
C34 180
"A" OSC.
L18 5Ω
C36 2-18
C38 11.5-342
R17 180K
R16 100K
R15 2.2 MEG.
C39 .05
C35 .01
C61 .01
-25 V.
+270 V.
C88 .005
R6 10K
C18 180
R7 15K
C16 100
C17 18
L16 (ON R5)
L9
R5 22K
FM
C20 2.5-13
C19 6.4-21
J1 (PINS AWAY FROM YOU)
117V. AC.
117V. AC.
S7
C87 .01
V4
V5
V6
V7
V8
V3
V1
V2
L7
L8
C23 .01
C22 .01
C21 100
R32 3
"A"
SWITCHES VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION.

NOTE:
For gain measurement, use a 3v battery connected to a.v.c. bus as indicated in schematic.

NOTE:
THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT BEING USED FOR THE PARTICULAR OPERATION. IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO EFFECT THE OPERATION OF THE RECEIVER.

Fig. 11. · Simplified schematic shown in "A" band position only (See note above).

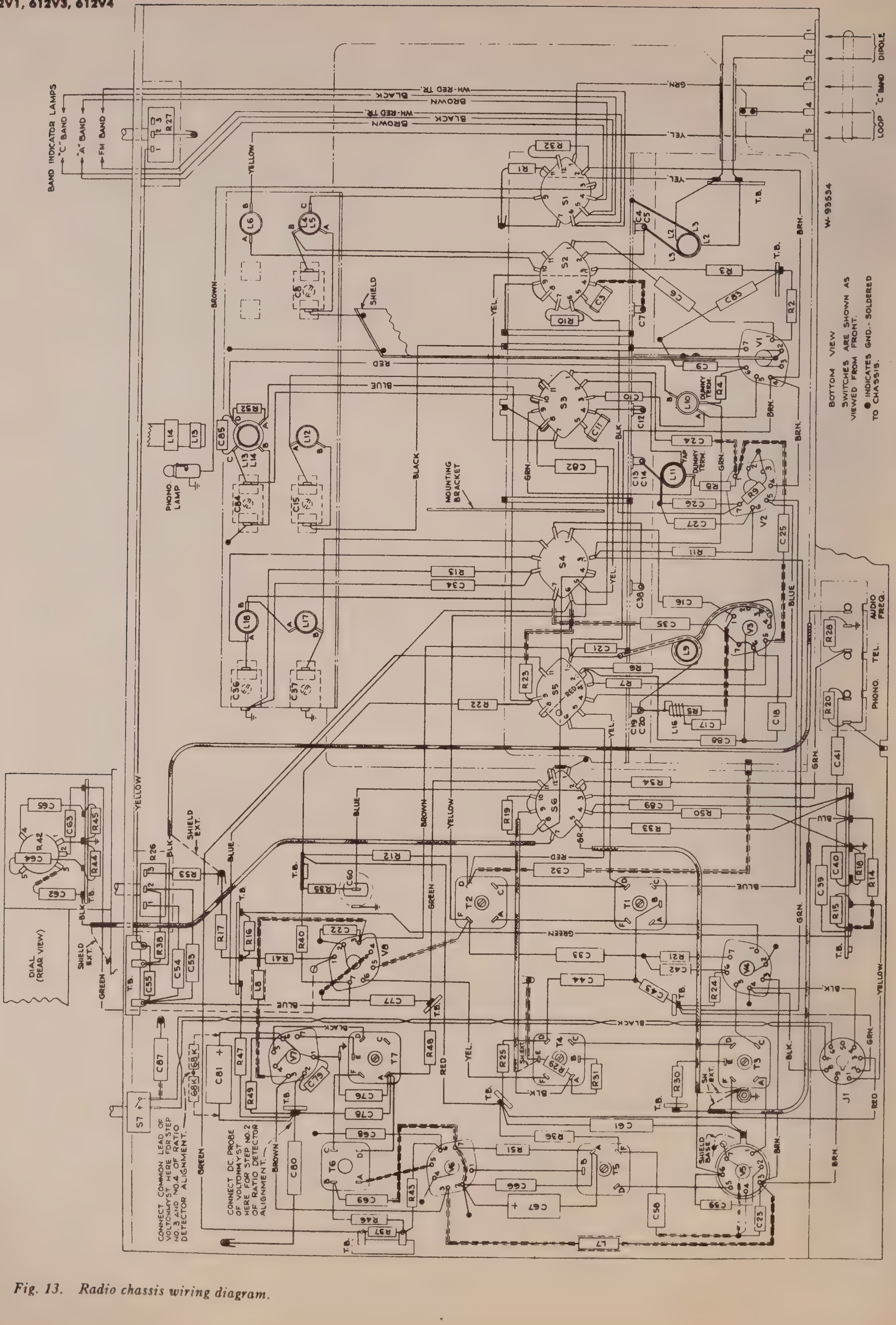


NOTE: THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT BEING USED FOR THE PARTICULAR OPERATION; IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO EFFECT THE OPERATION OF THE RECEIVER.

SWITCHES VIEWED FROM FRONT AND SHOWN IN "C" BAND POSITION.

"C" BAND CABINET WIRE
BLUE
V1 6BA6 R.F.
V2 6BA6 MIXER
V3 6BE6 OSC.
V4 6BA6 1ST. I.F.
V8 6AT6 DET.-AVC.-AF
T1-10.7 MC.
T2-455 KC.
T3-10.7 MC.
T4-455 KC.
S1 REAR
S1 FRONT
S2 REAR
S2 FRONT
S3 REAR
S3 FRONT
S4 REAR
S4 FRONT
S5 REAR
S5 FRONT
S6 REAR
S6-FRONT
"C" ANT L5
"C" R.F. L12
"A" R.F. L14
"C" OSC. L17
L10 RFC
L16 (ON R5)
L9
FM
THROUGH CONNECTION
R1 1 MEG.
R2 1 MEG.
R3 22K
R4 4700
R5 22K
R6 10K
R7 15K
R8 3.9 MEG.
R9 2200
R10 390
R11 27K
R12 2200
R15 2.2 MEG.
R16 100K
R17 180K
R19 1 MEG.
R21 100
R22 100
R24 1000
R25 2200
R29 270K
R31 22K
R32 3
R38 270
R40 270K
R41 2.2 MEG.
R42 1.5 MEG. VOL.CONTR. TAPPED AT 250K AND 500K
R44 22K
R45 27K
R52 2200
R26 2 MEG. L.F. TONE CONTROL
R27 1 MEG. H.F. TONE CONTROL
R53 270K
C3 330
C6 220
C7 10-448
C8 3-35
C9 .003
C10 220
C11 330
C12 10-448
C15 3-35
C16 100
C17 15
C18 180
C19 6.4
C20 2.5-13
C21 100
C22 .01
C23 .01
C24 56
C25 6.8
C26 .003
C27 .003
C29
C30
C31
C32 .01
C33 .05
C35 .01
C37 3-35
C38 11.5-342
C39 .05
C42 .005
C43 .005
C44 .005
C45
C46
C48
C49 100
C50 100
C53 .0012
C54 .01
C55 .005
C61 .01
C62 .01
C63 .01
C64 .015
C65 .015
C83 100
C87 .01
C88 .005
L7
L8
J1 (PINS AWAY FROM YOU)
S7
117 V. AC.
117 V. AC.
-25 V.
+270 V.
+100 V.
PHONO. INPUT
TEL. INPUT
A.F. OUTPUT
"C"
T-96203 A

Fig. 12. Simplified schematic shown in "C" band position only (See note above).

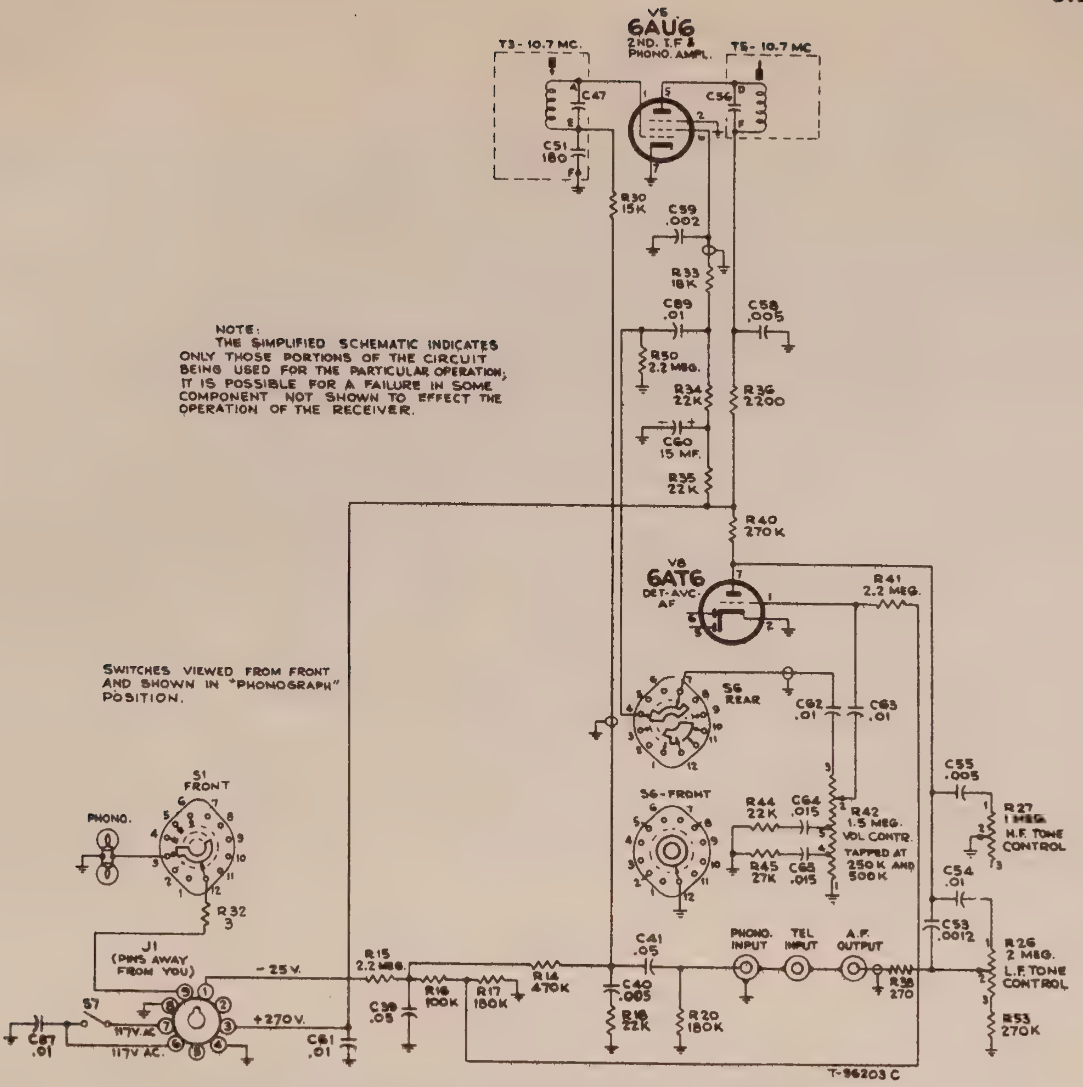

BAND INDICATOR LAMPS
"C" BAND
"A" BAND
FM BAND
R27
DIPOLE
LOOP "C" BAND
W-93534
T.B.
S1
S2
S3
S4
S5
S6
S7
V1
V2
V3
V4
V5
V6
V7
V8
T1
T2
T3
T4
T5
T6
T7
J1
PHONO LAMP
MOUNTING BRACKET
SHIELD
DUMMY TERM.
DIAL (REAR VIEW)
SHIELD EXT.
SHIELD BASE
AUDIO FREQ.
TEL.
PHONO.
YELLOW
BROWN
BLACK
WH-RED TR.
RED
BLUE
GREEN
GRN.
YEL.
BRN.
BLK.

BOTTOM VIEW
SWITCHES ARE SHOWN AS VIEWED FROM FRONT.
● INDICATES GND.- SOLDERED TO CHASSIS.

CONNECT COMMON LEAD OF VOLTOHMYST HERE FOR STEP NO.3 AND NO.4 OF RATIO DETECTOR ALIGNMENT.

CONNECT DC. PROBE OF VOLTOHMYST HERE FOR STEP NO.2 OF RATIO DETECTOR ALIGNMENT.

Fig. 13. Radio chassis wiring diagram.


V5
6AU6
2ND. I.F & PHONO. AMPL.
T3- 10.7 MC.
T5- 10.7 MC
C47
C56
C51
180
R30
15K
C59
.002
R33
18K
C89
.01
C58
.005
R50
2.2 MEG.
R34
22K
R36
2200
C60
15 MF.
R35
22K
R40
270 K
V8
6AT6
DET-AVC-AF
R41
2.2 MEG.
S6
REAR
C62
.01
C63
.01
S6-FRONT
R44
22 K
C64
.015
R42
1.5 MEG.
VOL CONTR.
TAPPED AT 250 K AND 500 K
R45
27K
C65
.015
C55
.005
R27
1 MEG.
H.F. TONE CONTROL
C54
.01
C53
.0012
R26
2 MEG.
L.F. TONE CONTROL
R53
270K
S1
FRONT
PHONO.
R32
3
J1
(PINS AWAY FROM YOU)
-25 V.
+270 V.
S7
117V. AC
117V AC.
C87
.01
C61
.01
R15
2.2 MEG.
C39
.05
R16
100K
R17
180K
R14
470K
C41
.05
C40
.005
R18
22K
R20
180K
PHONO. INPUT
TEL INPUT
A.F. OUTPUT
R38
270
T-96203 C

NOTE:
THE SIMPLIFIED SCHEMATIC INDICATES ONLY THOSE PORTIONS OF THE CIRCUIT BEING USED FOR THE PARTICULAR OPERATION; IT IS POSSIBLE FOR A FAILURE IN SOME COMPONENT NOT SHOWN TO EFFECT THE OPERATION OF THE RECEIVER.

SWITCHES VIEWED FROM FRONT AND SHOWN IN "PHONOGRAPH" POSITION.

Fig. 14. Schematic shown for phonograph reproduction.
Note: Oscillator plate voltage is removed when operating phonograph.

Push-Button Adjustment

The push-buttons should be adjusted for eight favorite stations after the receiver is operating, and has had a 5 or 10 minute warm-up period.

Any standard broadcast or frequency modulation stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Remove the first PUSH-BUTTON (Just pull) and note the adjustment screw beneath.
2. Loosen the adjustment screw.
3. Manually tune very accurately for the desired station.
4. Push the PUSH-BUTTON rod in till it is against stop.
5. Tighten adjustment screw.
6. Make adjustment for the other buttons, setting up and checking each for the chosen station in a similar manner.
7. Recheck all PUSH-BUTTONS and reset if found necessary.

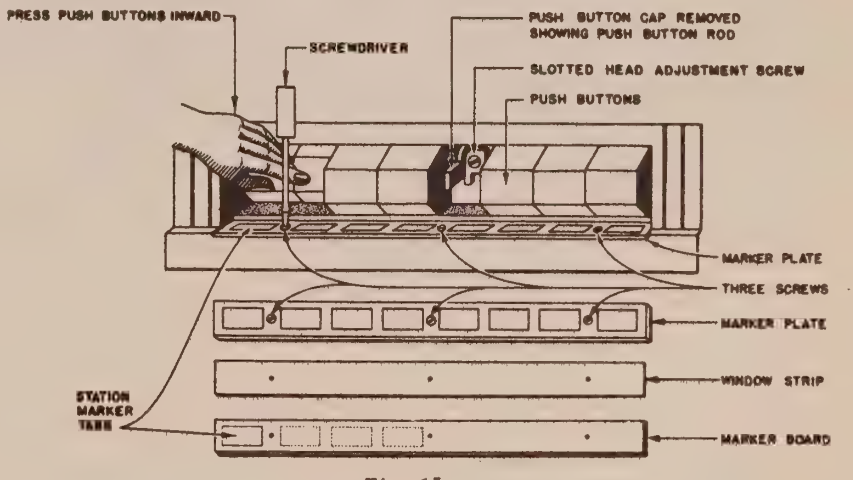

PRESS PUSH BUTTONS INWARD
SCREWDRIVER
PUSH BUTTON CAP REMOVED SHOWING PUSH BUTTON ROD
SLOTTED HEAD ADJUSTMENT SCREW
PUSH BUTTONS
MARKER PLATE
THREE SCREWS
MARKER PLATE
WINDOW STRIP
STATION MARKER TABS
MARKER BOARD
R-928

Fig. 15
Push-Button set-up

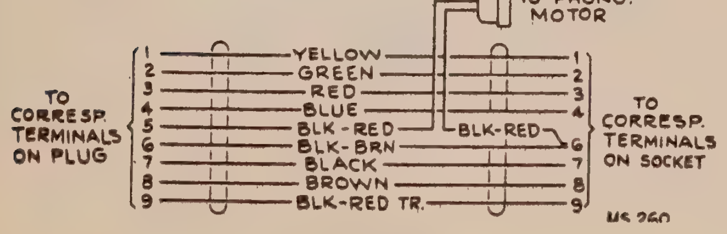
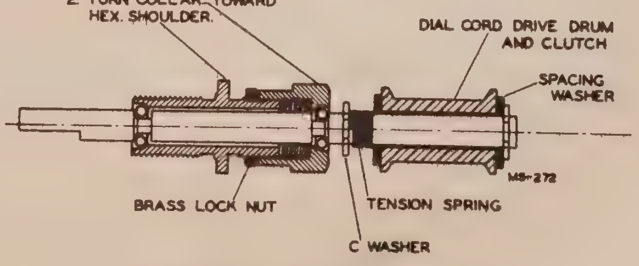

TO PHONO. MOTOR
TO CORRESP. TERMINALS ON PLUG
1 YELLOW 1
2 GREEN 2
3 RED 3
4 BLUE 4
5 BLK-RED
BLK-RED 6
6 BLK-BRN 6
7 BLACK 7
8 BROWN 8
9 BLK-RED TR. 9
TO CORRESP. TERMINALS ON SOCKET
MS 260

Fig. 15
Power Cable

Some instrument may not have the color code as indicated, therefore use continuity method to check cable assembly.

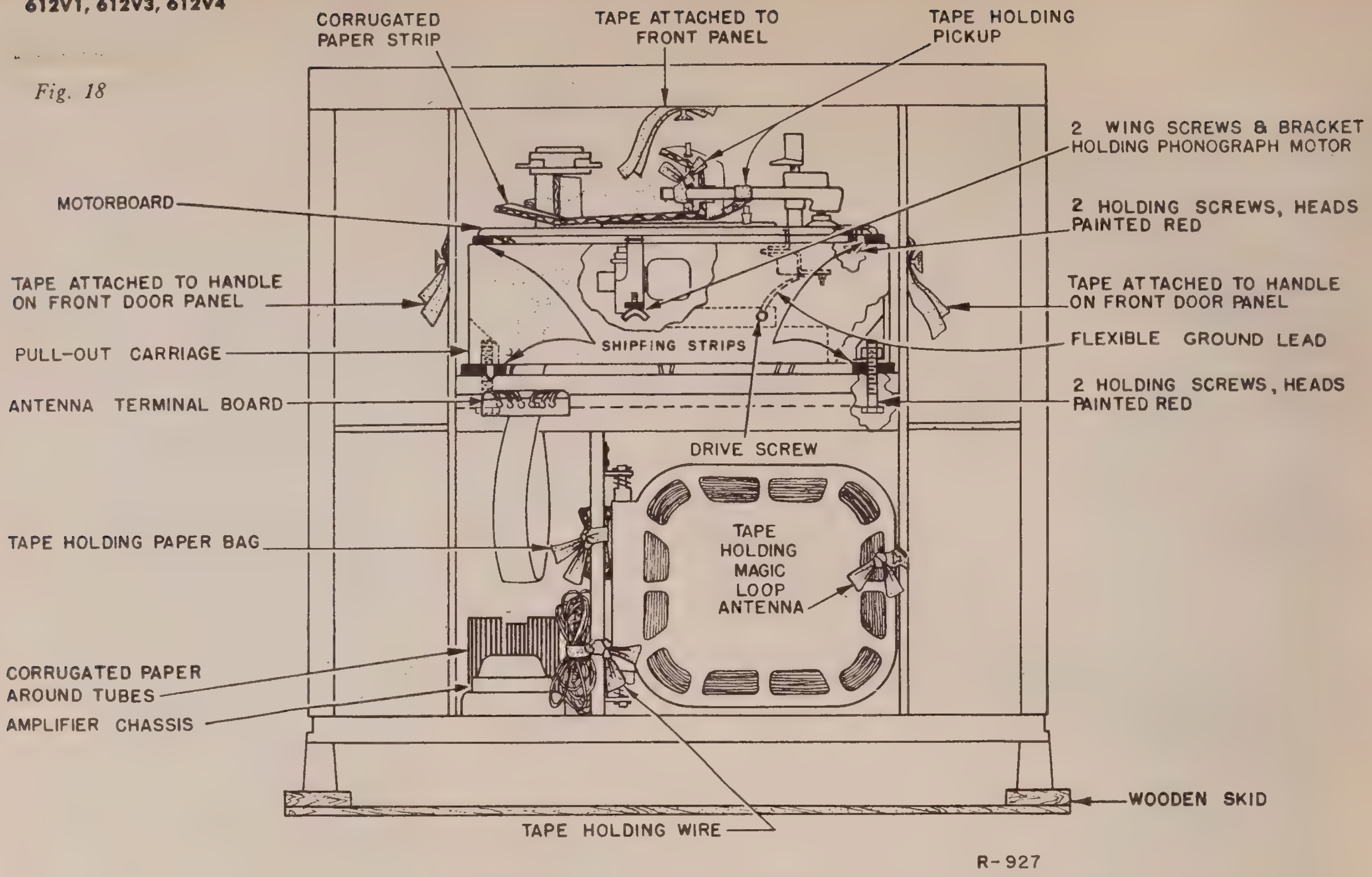
TO REMOVE SHAFT AND BALL BEARINGS:
1. LOOSEN BRASS LOCK NUT.
2. TURN COLLAR TOWARD HEX. SHOULDER.


DIAL CORD DRIVE DRUM AND CLUTCH
SPACING WASHER
MS-272
BRASS LOCK NUT
TENSION SPRING
C WASHER

SOME MODELS MAY HAVE EXTRA SPACING WASHER TO INCREASE CLUTCH FRICTION

Fig. 17
Tuning Shaft and Clutch Assembly

Fig. 18


CORRUGATED PAPER STRIP
TAPE ATTACHED TO FRONT PANEL
TAPE HOLDING PICKUP
2 WING SCREWS & BRACKET HOLDING PHONOGRAPH MOTOR
MOTORBOARD
2 HOLDING SCREWS, HEADS PAINTED RED
TAPE ATTACHED TO HANDLE ON FRONT DOOR PANEL
TAPE ATTACHED TO HANDLE ON FRONT DOOR PANEL
PULL-OUT CARRIAGE
SHIPFING STRIPS
FLEXIBLE GROUND LEAD
ANTENNA TERMINAL BOARD
2 HOLDING SCREWS, HEADS PAINTED RED
DRIVE SCREW
TAPE HOLDING PAPER BAG
TAPE HOLDING MAGIC LOOP ANTENNA
CORRUGATED PAPER AROUND TUBES
AMPLIFIER CHASSIS
WOODEN SKID
TAPE HOLDING WIRE
R-927

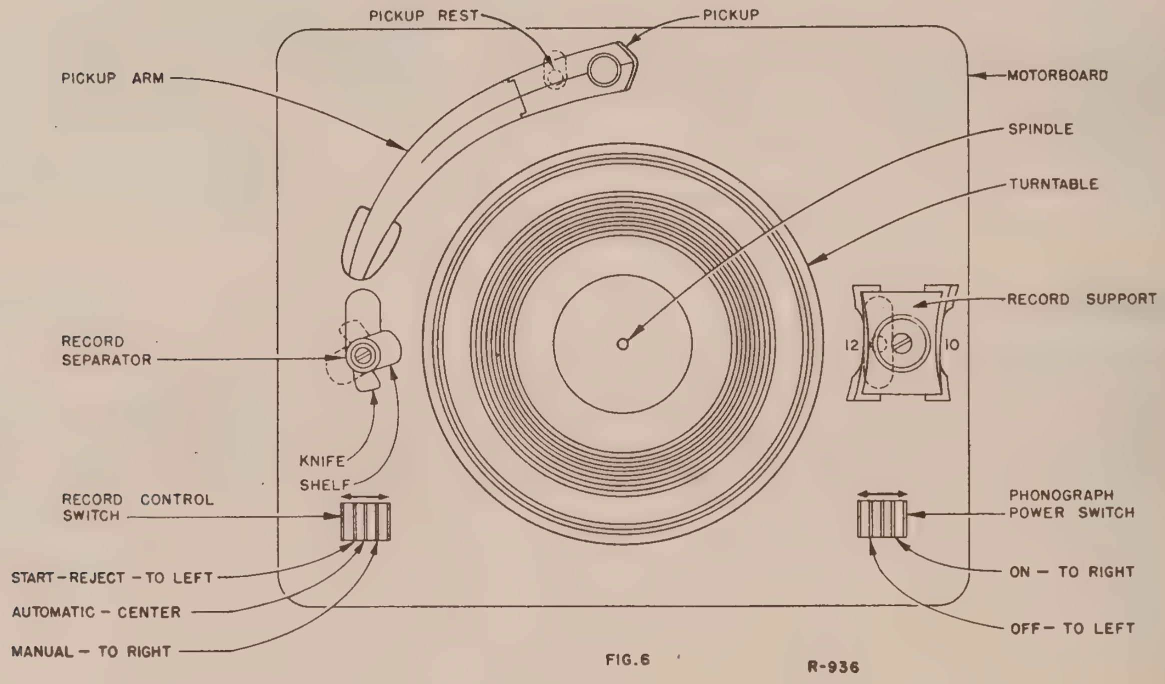
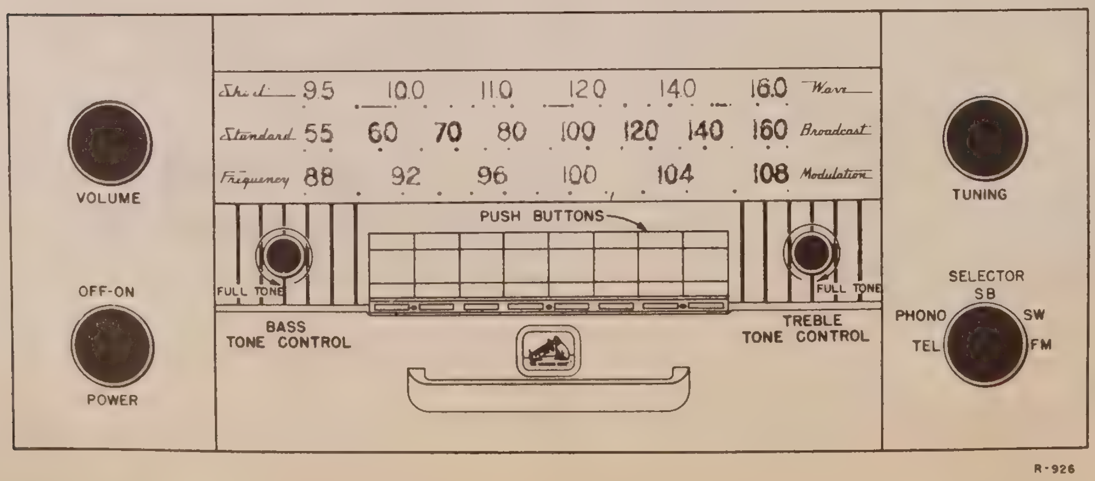
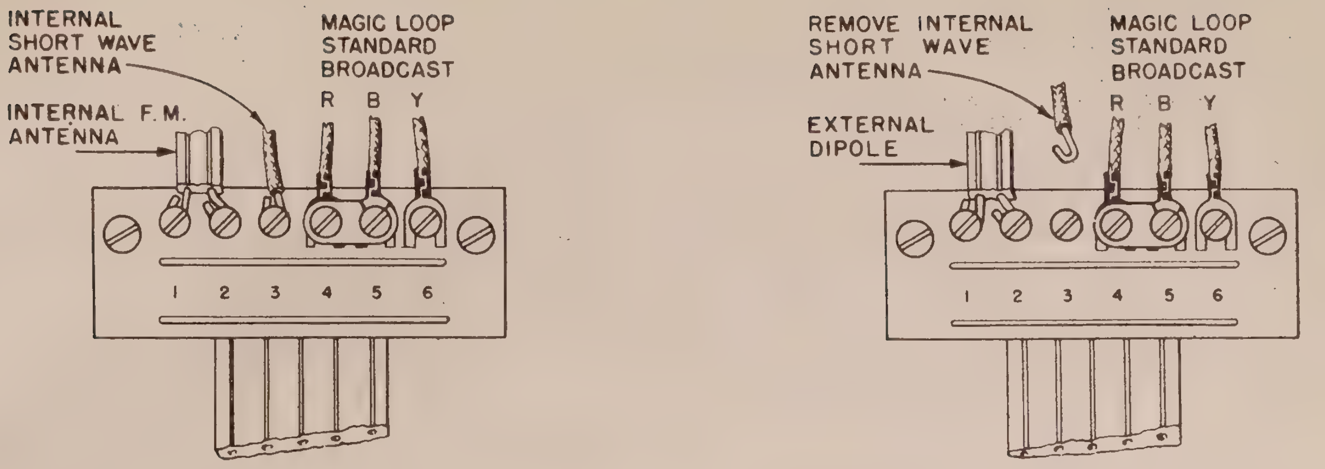

PICKUP REST
PICKUP
PICKUP ARM
MOTORBOARD
SPINDLE
TURNTABLE
RECORD SUPPORT
12
10
RECORD SEPARATOR
KNIFE
SHELF
RECORD CONTROL SWITCH
PHONOGRAPH POWER SWITCH
START-REJECT - TO LEFT
AUTOMATIC - CENTER
MANUAL - TO RIGHT
ON - TO RIGHT
OFF - TO LEFT
FIG.6
R-936

Fig. 19
Automatic record changer RP176 (see front page)

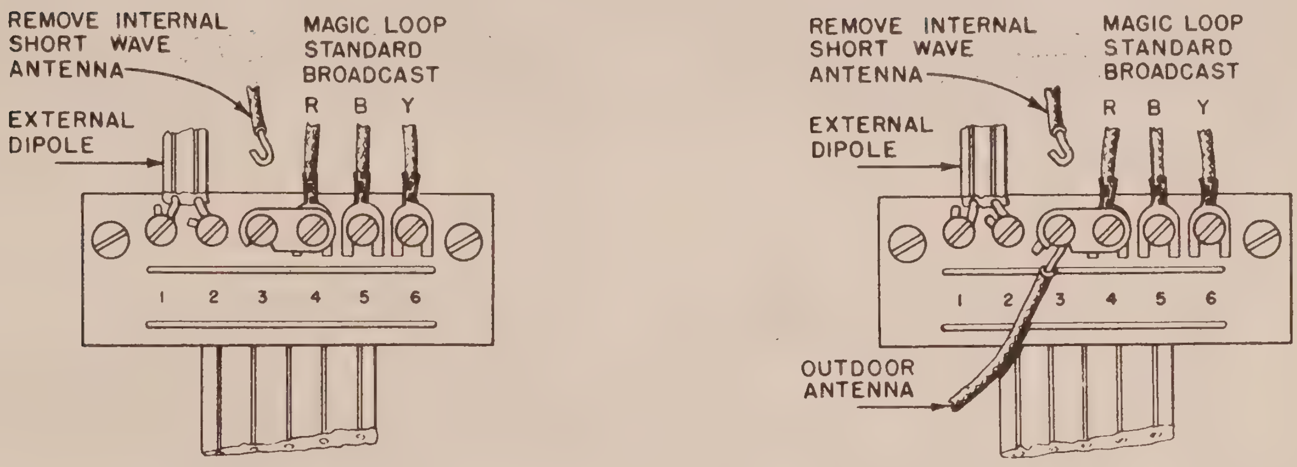
Fig. 20
Control Panel


Short 9.5 10.0 11.0 12.0 14.0 16.0 Wave
Standard 55 60 70 80 100 120 140 160 Broadcast
Frequency 88 92 96 100 104 108 Modulation
VOLUME
TUNING
PUSH BUTTONS
OFF-ON
POWER
FULL TONE
BASS TONE CONTROL
FULL TONE
TREBLE TONE CONTROL
SELECTOR
SB
PHONO
SW
TEL
FM
R-926


INTERNAL SHORT WAVE ANTENNA
INTERNAL F.M. ANTENNA
MAGIC LOOP STANDARD BROADCAST
R B Y
1 2 3 4 5 6
REMOVE INTERNAL SHORT WAVE ANTENNA
EXTERNAL DIPOLE
MAGIC LOOP STANDARD BROADCAST
R B Y
1 2 3 4 5 6

(A) INTERNAL ANTENNAS

(B) EXTERNAL DIPOLE ON FM & SW. MAGIC LOOP ON STANDARD BROADCAST BAND.


REMOVE INTERNAL SHORT WAVE ANTENNA
EXTERNAL DIPOLE
MAGIC LOOP STANDARD BROADCAST
R B Y
1 2 3 4 5 6
REMOVE INTERNAL SHORT WAVE ANTENNA
EXTERNAL DIPOLE
MAGIC LOOP STANDARD BROADCAST
R B Y
1 2 3 4 5 6
OUTDOOR ANTENNA

(C) EXTERNAL DIPOLE ON ALL BANDS

(D) EXTERNAL DIPOLE ON F.M. OUTDOOR ANTENNA OTHER BANDS

MS 259

Fig. 21
Antenna Terminal Board

EXTERNAL ANTENNAS—If reception is not satisfactory on one or more of the three bands, using the built-in cabinet antennas, an external antenna may be used. The Magic Loop Antenna will usually provide sufficient pickup on the Standard Broadcast band, but if an external dipole is installed to improve reception on Frequency Modulation it may be used for Standard Broadcast and Short Wave as well. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna, Stock No. 225 or 226, or the equivalent with 300-ohm transmission line is recommended for an external antenna.

Figure 21 (A) shows the *Antenna Terminal Board* with connections for *internal* cabinet *antennas.*

Figure 21 (B) shows connections for the RCA Television Antenna replacing those for the *internal FM antenna* on terminals 1 and 2, and the *internal SW antenna* disconnected at terminal 3. The external dipole antenna is now the antenna for FM and SW bands.

Figure 21 (C) shows the additional change for connecting the Standard Broadcast band to make use of the external RCA Television Antenna. The link across terminals 4 and 5 is changed to terminals 4 and 3. The external antenna is now effective on all bands. Tighten terminals and be sure that the red, black and yellow leads (R.B.Y.) to terminals 4, 5 and 6 are still in place and securely connected.

Figure 21 (D) shows connections for a separate outdoor antenna on SW and SB reception, and the external dipole on FM. This outdoor antenna should consist of a wire 30 to 60 feet or so in length mounted in a convenient location as high as possible. Connect lead-in from the antenna to terminal 3 on the antenna terminal board. This outdoor antenna is effective on SB and SW bands. If this connection makes the SB signal too strong, causing overload and distortion, replace the link across terminals 4 and 5 as in Figure 21 (A) and (B). This outdoor antenna is now effective on SW only

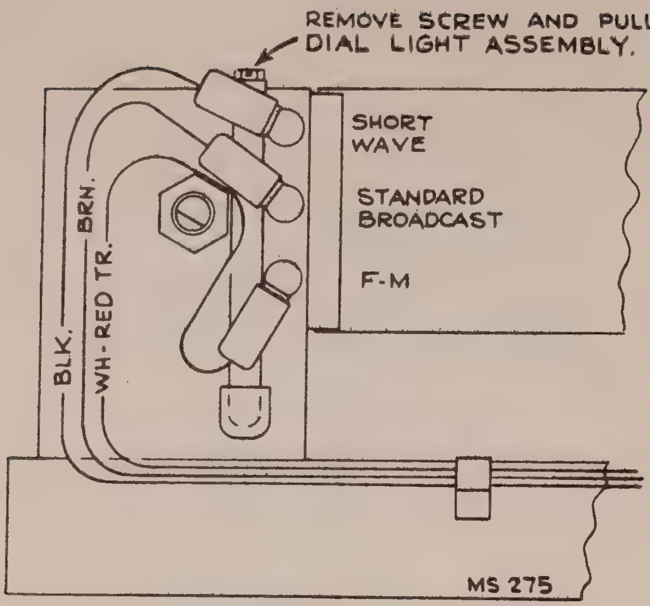

REMOVE SCREW AND PULL DIAL LIGHT ASSEMBLY.
SHORT WAVE
STANDARD BROADCAST
F-M
BRN.
WH-RED TR.
BLK.
MS 275

Fig. 22

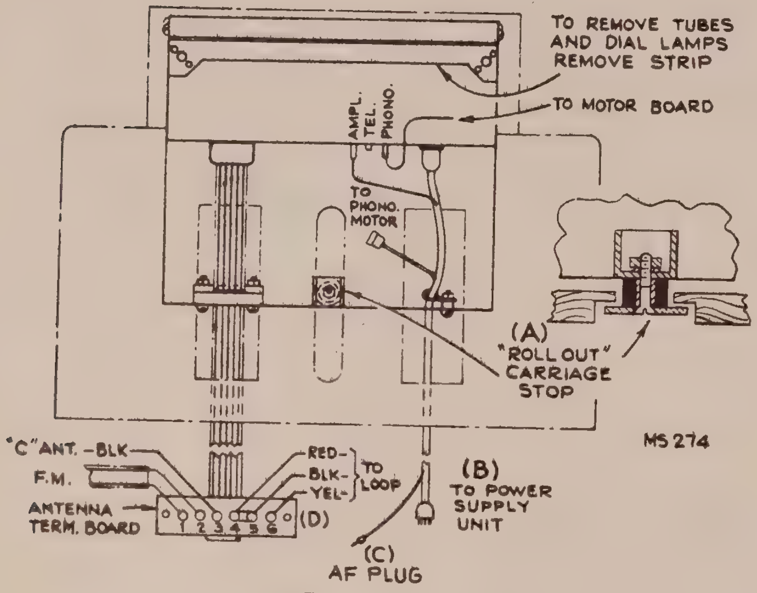

TO REMOVE TUBES AND DIAL LAMPS REMOVE STRIP
AMPL.
TEL.
PHONO.
TO MOTOR BOARD
TO PHONO. MOTOR
(A) "ROLL OUT" CARRIAGE STOP
MS 274
"C" ANT. -BLK
F.M.
ANTENNA TERM. BOARD
1 2 3 4 5 6
(D)
RED-
BLK-
YEL-
TO LOOP
(B) TO POWER SUPPLY UNIT
(C) AF PLUG

Fig. 24

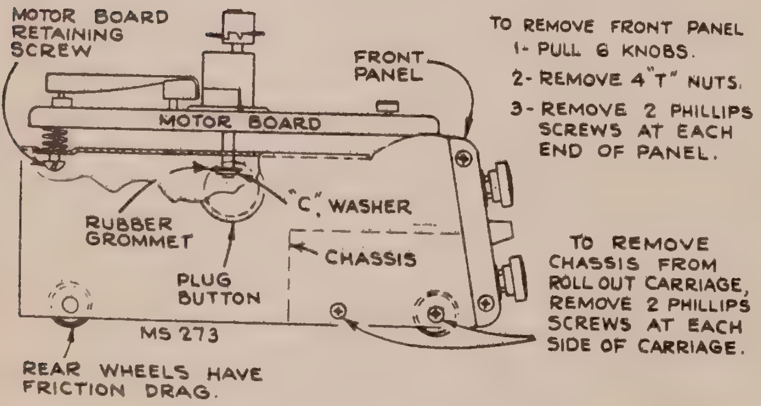

MOTOR BOARD RETAINING SCREW
FRONT PANEL
MOTOR BOARD
TO REMOVE FRONT PANEL
1- PULL 6 KNOBS.
2- REMOVE 4 "T" NUTS.
3- REMOVE 2 PHILLIPS SCREWS AT EACH END OF PANEL.
"C" WASHER
RUBBER GROMMET
CHASSIS
PLUG BUTTON
TO REMOVE CHASSIS FROM ROLL OUT CARRIAGE, REMOVE 2 PHILLIPS SCREWS AT EACH SIDE OF CARRIAGE.
MS 273
REAR WHEELS HAVE FRICTION DRAG.

Fig. 25

Caution:—

Do not attempt to remove chassis while the "Roll-out" carriage is in the cabinet. Remove the entire carriage from the cabinet to prevent damaging cabinet finish.

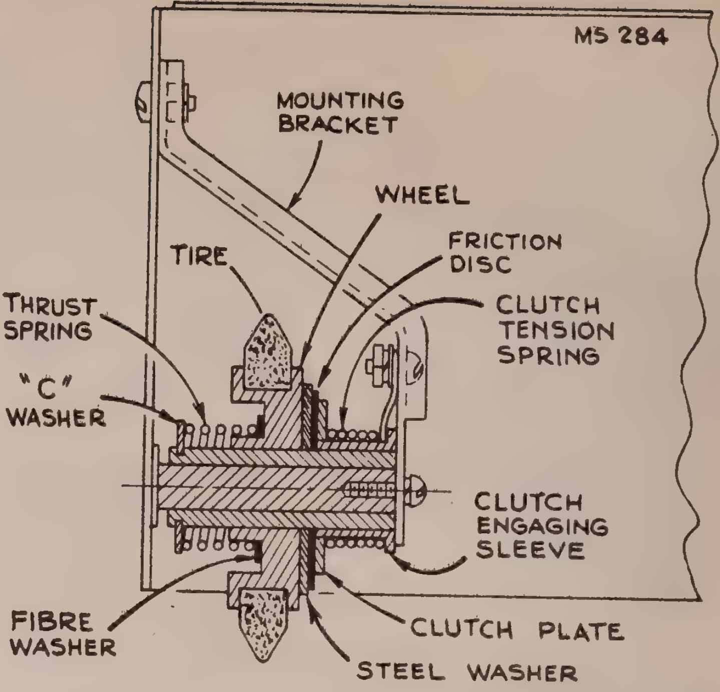

MS 284
MOUNTING BRACKET
WHEEL
FRICTION DISC
TIRE
THRUST SPRING
CLUTCH TENSION SPRING
"C" WASHER
CLUTCH ENGAGING SLEEVE
FIBRE WASHER
CLUTCH PLATE
STEEL WASHER

Fig. 23
Friction clutch used on early models only.

No adjustment has been provided to govern the friction in the clutch on the rear wheels of the "Roll-out" carriage. If the drag becomes too great add a small amount of grease to friction disc (Fig. 23).

Removal of dial lamps

1. Remove plug buttons on side of "Roll-out" (Fig. 25).
2. Remove "C" washer on record player (Fig. 25).
3. Raise record player (Fig. 26).
4. Remove tube strip (Fig. 24).
5. Loosen screw and pull dial light strip (Fig. 22).

Removal of Tubes

Use the same procedure as for removal of dial lamps excluding item #5.

Removal of "Roll-out" carriage

1. Remove "Roll-out" stop (A) (Fig. 24).
   (Access to nut can be made up through slot in bottom of carriage platform in rear of cabinet).
2. Pull out power cable plug (B) (Fig. 24) at power supply, also loosen cable clamps.
3. Remove audio plug (C) (Fig. 24).
4. Remove antenna wires and antenna terminal strip (D) (Fig. 24).
5. Pull "Roll-out" carriage out through front of cabinet.

To remove record player

1. Remove plug buttons and "C" washer (Fig. 25).
2. Tilt motor board (Fig. 26).
3. Pull AC and phono plugs (Fig. 24).
4. Remove retaining screws (Fig. 26).
5. Lift motor board out.

To remove front panel and chassis from "Roll-out"

1. Remove entire "Roll-out" carriage from cabinet.
2. Pull six control knobs (Fig. 25).
3. Remove four "T" nuts (Fig. 25) (Do not break fiber washers).
4. Remove two cross-recess head screws at each end of panel (Fig. 25).
5. Remove two cross-recess head screws at each end of carriage (Fig. 25).
6. Lift chassis out through front of carriage.

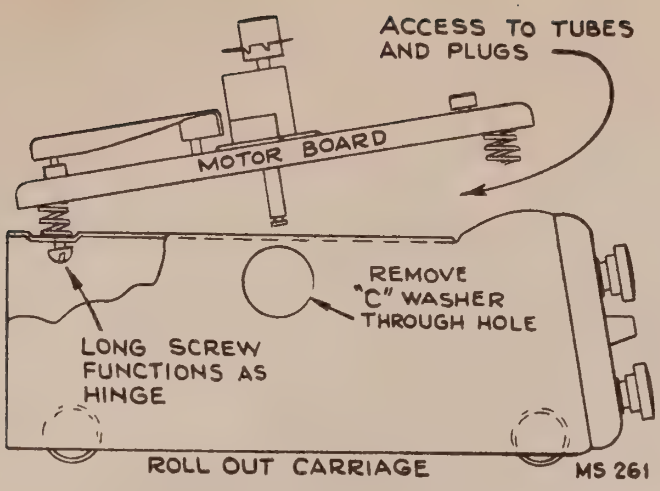

ACCESS TO TUBES AND PLUGS
MOTOR BOARD
REMOVE "C" WASHER THROUGH HOLE
LONG SCREW FUNCTIONS AS HINGE
ROLL OUT CARRIAGE
MS 261

Fig. 26

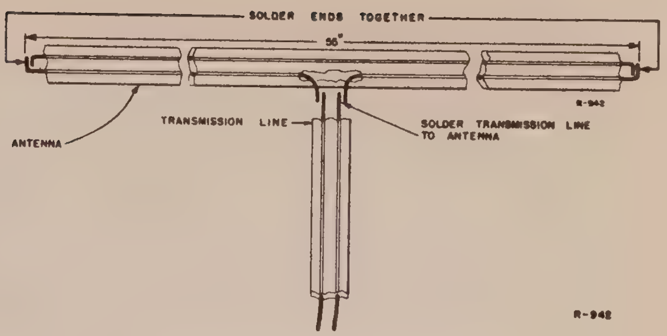

SOLDER ENDS TOGETHER
56"
ANTENNA
TRANSMISSION LINE
SOLDER TRANSMISSION LINE TO ANTENNA
R-942
R-942

Fig. 27
Sketch showing folded dipole installed in cabinet.

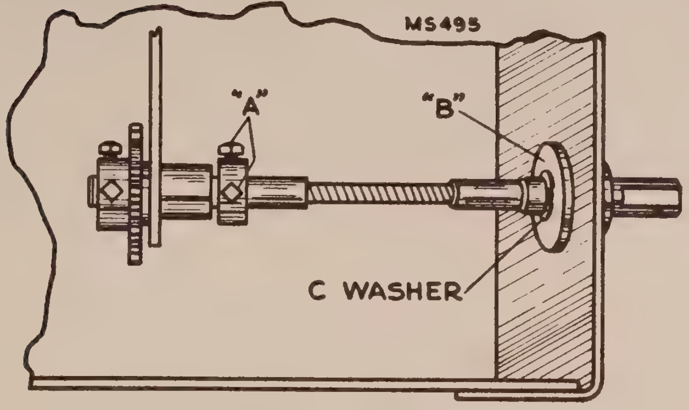

MS495
"A"
"B"
C WASHER

Fig. 28
Range Switch Coupling Shaft.
Early Production.

To Remove: Loosen square head set screws "A" in collar of shaft, remove C washer from shaft at inside end of bushing "B", push shaft thru bushing to permit removal of "C" washer normally recessed inside bushing. Pull shaft thru bushing to inside of chassis.

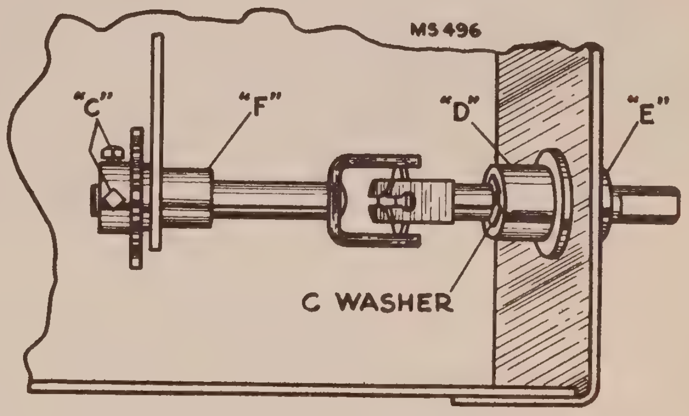

MS496
"C"
"F"
"D"
"E"
C WASHER

Fig. 29
Range Switch Coupling Shaft.
Late Production.

To Remove: Loosen square head set screws "C" in collar of gear. Remove nut "E" (on front apron of chassis) from bushing "D". Push shaft and bushing to the rear so that shaft and bushing are clear of the chassis apron. Flex the shaft and pull forward. To remove bushing from shaft use procedure described for early type shaft.

THE RATIO DETECTOR

The ratio detector, appearing in RCA post-war f-m receivers, is a new device for converting a frequency modulated carrier to an audio signal, while at the same time offering a high degree of attenuation to any incident amplitude modulation. The relative insensitivity to amplitude variations, which is an inherent characteristic of ratio detectors, enables them to be used without the usual preceding limiter stage, thus affording the use of a high gain i-f stage instead of the low-gain limiter.

Theory of Operation

A brief review of the theory of the discriminator detector will help the serviceman to understand the action of the ratio detector.

Figure 1 portrays a conventional discriminator stage, and it can be seen that it consists essentially of two diode rectifiers which are differentially connected so that the d-c potentials across their respective load resistors are subtractive. These two d-c voltages (across R1 and R2 in Figure 1) are proportional to the a-c voltages applied to the diodes. The a-c voltage applied to each diode is the vector sum of E1 and the voltage across that half of L1 which is connected to the diode plate, as shown in the diagrams of Figure 4. E1 has practically the same amplitude and phase as the voltage across the tank in the limiter plate circuit. The current in this same tank circuit induces a voltage in L1, which causes a circulating current to flow in the resonant circuit composed of L1 and C1. E2 and E3 are the voltage drops which occur across each half of L1 as a result of this circulating current. When the carrier frequency is equal to the frequency at which the discriminator transformer is tuned (Fig. 4A), the a-c voltage applied to diode 1 equals that applied to diode 2, therefore the rectified voltages are equal and since they are bucking voltages, the output of the discriminator is zero.

DISCRIMINATOR

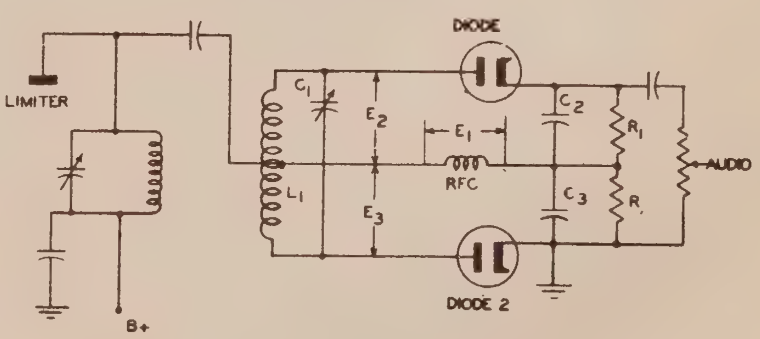

LIMITER
B+
C1
L1
E2
E1
E3
RFC
DIODE
DIODE 2
C2
C3
R1
R
AUDIO

FIG. I

When the carrier frequency increases during a half cycle of modulation, the phase relations between E1, E2 and E3 change in accordance with Figure 4B, and it is evident that the vector sum of the voltages applied to diode 2 exceeds the vector sum of the voltages applied to diode 1, resulting in a higher rectified voltage across R2 than across R1. The instantaneous difference of the rectified voltages appears as a negative voltage in the discriminator output. Figure 4C shows the condition occurring when the carrier frequency swings below the resonant frequency of the discriminator transformer, the end result being a positive voltage at the output of the discriminator.

The important fact in discriminator action is that the output voltage is proportional to the difference between Ediode 1 and Ediode 2. This is true because the d-c voltages appearing across R1 and R2 vary directly with Ediode 1 and Ediode 2, respectively, and the instantaneous output voltage is the difference between the rectified voltage drops.

In considering the effect of amplitude variation on discriminator output, refer again to the vector diagrams of Figure 4. An increase in the amplitude of the voltage applied to the discriminator would increase all of the vectors in the diagram proportionately. In other words, the effect would be as though the vector diagrams were enlarged photographically. It can be seen that while the phase relationships would remain the same, the difference between Ediode 1 and Ediode 2 would increase, so long as the frequency of the applied voltage differed even slightly from the receiver i-f. Thus components of amplitude modulation would be detected and passed on to the audio amplifier. Ordinarily, discriminators are preceded by limiters which remove most of the amplitude variation from the f-m carrier, but the discriminator itself is not a device capable of rejecting amplitude modulation, except when the instantaneous frequency of the applied carrier is exactly equal to the resonant frequency of the discriminator transformer. This condition occurs only twice in every modulation cycle.

Note that while an increase in the amplitudes of the vectors in Figure 4 results in a proportionate increase in the difference between Ediode 1 and Ediode 2 for off-resonant conditions, the ratio of Ediode 1 to Ediode 2 is a constant, as far as amplitude variations are concerned. Therefore, a detector responsive only to changes in the ratio of Ediode 1 to Ediode 2, and insensitive to changes in the difference between these voltages would be a detector capable not only of converting frequency variations to audio variations, but of rejecting any amplitude modulation. Such a detector is the ratio detector.

A schematic of the fundamental ratio detector is shown in Figure 2. C7 and C4 have very little reactance at the intermediate frequency, so it is evident that the parallel resonant circuit L2 C2 is the true load for the driver stage, this stage being shunt fed. A driver stage, in this case, is nothing more than a conventional i-f amplifier preceding the ratio detector. L2 is inductively coupled to L1, therefore a comparison of Figures 1 and 2 will show that as far as the a-c voltages applied to the diodes are concerned, these circuits are almost exactly similar, indeed, the same vector diagrams used in the analysis of Figure 1 can be used to portray the a-c voltages across the diodes in Figure 2. Here the similarity ends, because the ratio detector method of extracting intelligence from the f-m carrier differs greatly from previously used methods. Diode 1, R3, and diode 2 complete a series circuit fed by the a-c voltage across L1. Since the two diodes are in series, they will conduct on the same half cycle, and the rectified current through R3 will cause a negative potential to appear at the plate of diode 1. The time constant of R3 C6 is usually about 0.2 second, so that the negative potential at the plate of diode 1 will remain constant even at the lowest audio frequencies to be reproduced.

C3 will be charged by the rectified current through diode 1 to a voltage proportional to the voltage represented by vector Ediode 1 (Figure 4), and C4 will be charged through diode 2 in proportion to the vector Ediode 2. Since the magnitudes of these vectors differ according to the instantaneous frequency of the carrier, the voltages across C3 and C4 will differ proportionately, the voltage across C3 being the larger of the two voltages at carrier frequencies below the i-f, and the smaller at frequencies above the i-f.

Note that the voltages across C3 and C4 are additive and that their sum is fixed by the constant potential across R3. Therefore, while the ratio of these voltages will vary at an audio rate, their sum will always be constant and equal to the voltage across R3. The potential at the junction of C3 and C4 will vary at an audio rate when an f-m carrier is applied to the detector, hence the audio voltage is extracted at this point and fed into the audio amplifier.

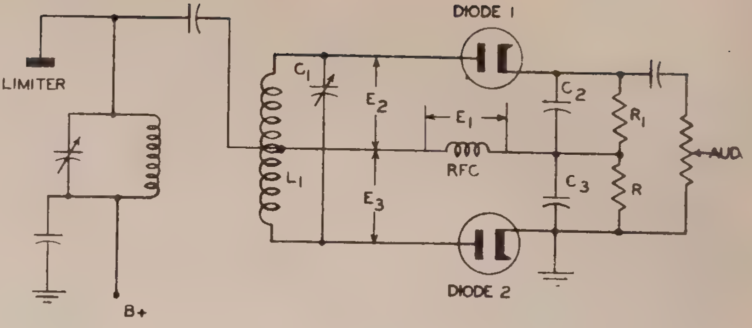


FIG. 1

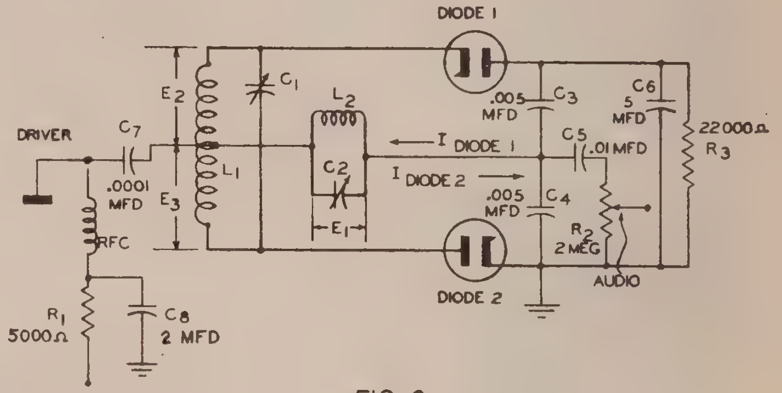


FIG. 2

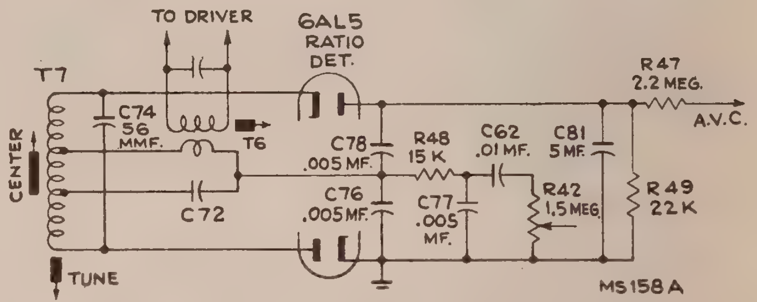
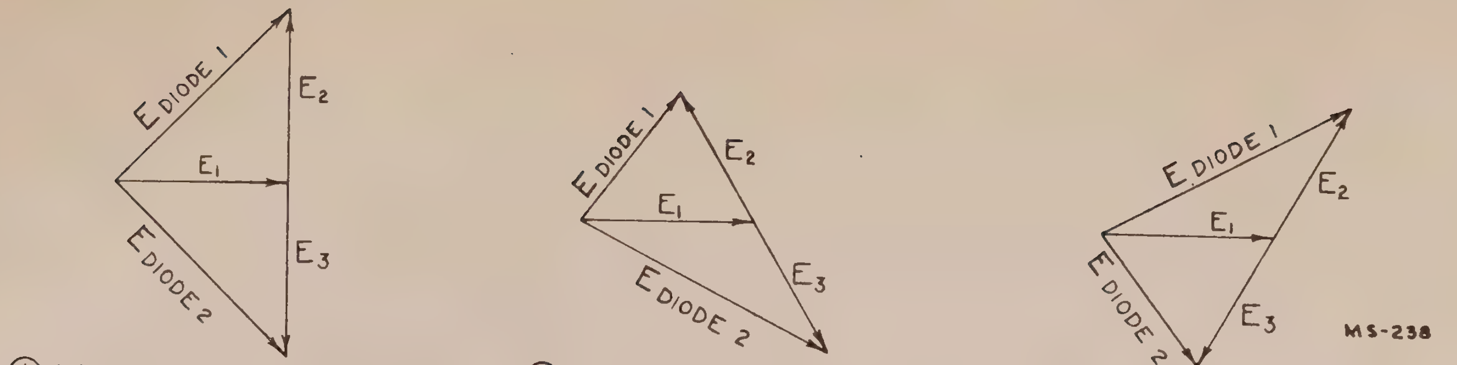


FIG.3 - RATIO DETECTOR

There is no direct d-c return path across either C3 or C4; the reason for this is twofold. Firstly, a direct return path is not needed because whenever the potential of the junction of C3 and C4 is raised or lowered in accordance with the frequency of the voltage applied to the detector, there will be a point on R3 having a potential equal to the voltage across C4. This point will shift up and down on R3 in synchronism with the audio voltage across C4. If this point could be connected to the junction of C3 and C4, a d-c return for each diode would be provided, but no current would flow through the connection because there would be no difference of potential between the point on R3 and the junction of C3 and C4. Since no current would flow through this connection, a direct return path would be useless.

Secondly, a peculiar form of distortion, apparent at low carrier levels, is evident if a resistance is connected directly across C4. This distortion is caused by C4 discharging through the resistance whenever the carrier level falls below the level at which the diodes are biased off by the voltage across R3. The effect of the distortion is to add a long peak to one loop of the audio cycle.

The rejection of amplitude modulation in the ratio detector may be explained as follows: A rapid increase in the amplitude of the carrier applied to the ratio detector will tend to increase the d-c voltages across C3 and C4. The sum of these voltages must always be equal to the voltage across C6. The voltage across C6 cannot change with a rapid increase in the amplitude of the carrier, due to the large time constant of R3 and C6. Therefore, this constant potential across C6 prevents the voltages across C3 and C4 from rising with an increase in the strength of the carrier. A reduction in carrier amplitude is prevented from appearing as a reduction in the voltages across C4 in the same way. The constant voltage across C6 can be considered to be a stabilizing voltage; i.e., it stabilizes the ratio detector output against amplitude modulation of the applied carrier.



Ⓐ CARRIER FREQUENCY AT I-F

Ⓑ CARRIER FREQUENCY ABOVE I-F

Ⓒ CARRIER FREQUENCY BELOW I-F

Fig. 4

The time constant of R3 C6 is not too large to prevent average changes in carrier level from appearing as changes in voltage across R3; in other words the voltage across R3 is proportional to the average strength of the received carrier. Thus this voltage serves as an excellent AVC voltage.

There is no "threshold" effect apparent in the ratio detector; i.e., there is no minimum carrier level which must be applied to the detector to cause noise attenuation as in other types of f-m detectors requiring the use of a limiter stage.

The Ratio Detector used in this receiver, differing only in the method of applying i-f energy to L1 and C1, is shown in Figure 3. This circuit, as well as any other ratio detector circuit, can be broken down and analyzed in almost the same manner as was the basic ratio detector circuit of Figure 2.

Replacement Parts

STOCK No.	DESCRIPTION
	HEAD END UNIT RK 121
71964	Arm—Push arm and cam for tuning condenser
3658	Ball—Steel ball (3/32″ dia.) for tuning condenser
10705	Ball—Steel ball (5/32″ dia.) for tuning condenser
71651	Ball—Steel ball (3/32″ dia.) for manual tuning shaft
71638	Board—5 contact terminal board for antenna lead-in
71643	Bracket—Dial plate support bracket—L.H.
71642	Bracket—Dial plate support bracket—R.H.
71811	Bracket—Idler bracket less pulleys
72986	Bushing—Threaded bushing for knob end of switch coupling shaft (late production)
71804	Capacitor—Adjustable, 1.6-18 mmf. (C5, C13)
71809	Capacitor—Adjustable, 1.6-18 mmf. (C84)
71803	Capacitor—Adjustable, 2.5-13 mmf. (C20)
71808	Capacitor—Adjustable, 3-35 mmf. (C36, C37)
71930	Capacitor—Ceramic, 5.6 mmf. (C85)
39043	Capacitor—Ceramic, 6.8 mmf. (C25)
71807	Capacitor—Adjustable, 10-160 mmf. (C8, C15)
71924	Capacitor—Ceramic, 56 mmf. (C24)
39396	Capacitor—Ceramic, 100 mmf. (C16, C21, C83)
71922	Capacitor—Ceramic, 180 mmf. (C34)
71933	Capacitor—Mica, 180 mmf. (C18)
71920	Capacitor—Ceramic, 220 mmf. (C6, C10)
71919	Capacitor—Ceramic, 330 mmf. (C3, C11)
71929	Capacitor—Ceramic, 1000 mmf. (C80)
72117	Capacitor—Tubular, .0012 mfd., 400 volts (C53)
71927	Capacitor—Tubular, .002 mfd., 400 volts (C59)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C9, C26, C27, C82)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C40, C77)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C42, C43, C66, C76, C78)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C44, C55, C58, C68, C69, C88)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C64, C65)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C22, C23, C62, C63)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C32, C35, C54, C89)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C61)
71588	Capacitor—Molded paper, .01 mfd., 600 volts (C87)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C33, C39, C41, C79)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C67, C81)
32223	Capacitor—Electrolytic, 15 mfd., 300 volts (C60)
71646	Clamp—Dial clamp (2 required)
71940	Coil—Antenna coil—F.M.—complete with adjustable core and stud (L2, L3)
71856	Coil—Antenna coil—"C" band—complete with adjustable core and stud (L4, L5)
71855	Coil—Loop loading coil—"A" band—complete with adjustable core and stud (L6)
71942	Coil—Filament choke coil (L7, L8)
71937	Coil—Oscillator coil—F.M.—complete with adjustable core and stud (L9)
71939	Coil—R.F. choke coil (L10)
71938	Coil—R.F. coil—F.M.—complete with adjustable core and stud (L11)
71854	Coil—R.F. coil—"C" band—complete with adjustable core and stud (L12)
71857	Coil—R.F. coil—"A" band—complete with adjustable core and stud (L13, L14)
71853	Coil—Oscillator coil—"C" band—complete with adjustable core and stud (L17)
71852	Coil—Oscillator coil—"A" band—complete with adjustable core and stud (L18)
38405	Control—Tone control—H.F. (R27)
38401	Control—Tone control—L.F. (R26)
71596	Control—Volume control (R42)
72987	Cord—Manual drive cord (approx. 30″ overall)
72987	Cord—Indicator drive cord (approx. 42″ overall)
71941	Coupling—F.M. coupling unit (L16, C17, R5)
71652	Dial—Glass dial scale—Short Wave
71653	Dial—Glass dial scale—Standard Broadcast
71654	Dial—Glass dial scale—F.M.
71805	Drum—Drive drum
71800	Gear—12 tooth gear fastened to selector switch coupling shaft
71801	Gear—18 tooth gear fastened to selector switch shaft
35844	Gear—Scissor gear for tuning condenser
70429	Grommet—Rubber grommet to mount tube socket
71799	Grommet—Rubber grommet to mount cradle (6 required)
71647	Guide—Indicator slide guide
71832	Indicator—Station selector indicator
11765	Lamp—Dial lamp, Mazda #51
11891	Lamp—Pilot lamp, Mazda #44
71962	Pinion—Pinion and shaft for tuning condenser
71963	Plate—Bearing plate for tuning condenser pinion
72984	Plate—Connecting plate for selector switch extension shafts (late production)
71644	Plate—Dial back plate less window, dial strips, support, slide, indicator and pulleys
71648	Pulley—Idler pulley (2 required) and indicator cord pulley
71650	Pulley—Manual tuning shaft cord pulley
71636	Receptacle—9 prong male for power cable (J1)
71637	Receptacle—Television, audio and phono input jack
72323	Resistor—Wire wound, 3 ohms, ½ watt (R32)
	Resistor—Fixed composition, 10 ohms, ±20%, ½ watt (R54)
	Resistor—Fixed composition, 100 ohms ±10%, ½ watt (R21, R22)
	Resistor—Fixed composition, 270 ohms ±10%, ½ watt (R38)
	Resistor—Fixed composition, 390 ohms ±10%, ½ watt (R10)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R24, R37, R46)
	Resistor—Fixed composition, 2200 ohms ±20%, ½ watt (R12, R25, R36)
	Resistor, Fixed composition, 2200 ohms ±10%, ½ watt (R9, R52)
	Resistor—Fixed composition, 4700 ohms ±20%, ½ watt (R4)
	Resistor—Fixed composition, 8200 ohms ±10%, ½ watt (R13)
	Resistor—Fixed composition, 10,000 ohms ±10%, 1 watt (R6)
	Resistor—Fixed composition, 15,000 ohms ±20%, ½ watt (R30, R51)
	Resistor—Fixed composition, 15,000 ohms ±10%, ½ watt (R48)
	Resistor—Fixed composition, 15,000 ohms ±10%, 1 watt (R7)
	Resistor—Fixed composition, 18,000 ohms ±10%, ½ watt (R33)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R3, R31, R35, R49)
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R18, R34, R44)
	Resistor—Fixed composition, 22,000 ohms ±20%, 1 watt (R43)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R11, R45)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R28)
	Resistor—Fixed composition, 100,000 ohms ±10%, ½ watt (R16)
	Resistor—Fixed composition, 180,000 ohms ±10%, ½ watt (R17, R20)
	Resistor—Fixed composition, 270,000 ohms ±10%, ½ watt (R29, R40, R53)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R14)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R1, R2, R19)
	Resistor—Fixed composition, 2.2 megohm ±10%, ½ watt (R15, R41, R47, R50)
	Resistor—Fixed composition, 3.9 megohm ±10%, ½ watt (R8)
	Resistor—Fixed composition, 22 megohms ±20%, ½ watt (R23)
71798	Screw—#8-32 x 5/32″ square head set screw
71965	Screw—Push arm locking screw

(Continued on following page)

Replacement Parts (Continued)

STOCK No.	DESCRIPTION
71812	Shaft—Manual tuning shaft less spring and pulley
71806	Shaft—Selector switch coupling shaft—switch end (early production)
71641	Shaft—Selector switch flexible coupling shaft (early production)
72982	Shaft—Selector switch coupling shaft—switch end (late production)
72983	Shaft—Selector switch coupling shaft—knob end—less threaded bushing (late production)
72951	Shield—Lead tube shield
71834	Socket—Lamp socket—L.H.
71833	Socket—Lamp socket—R.H.
71931	Socket—Pilot lamp socket
72516	Socket—Tube socket, miniature
71850	Socket—Tube socket complete with base and shield
71649	Spring—Coil spring for manual tuning shaft
71936	Spring—Drive cord spring
33622	Spring—Tuning condenser push arm return spring
71645	Support—Glass support (rubber) (2 required)
71640	Switch—Power switch (S7)
71802	Switch—Selector switch (S1, S2, S3, S4, S5, S6)
71845	Transformer—First I. F. transformer F.M. (T1, C28, C30)
71846	Transformer—First I. F. transformer A.M. (T2, C29, C31)
71847	Transformer—Second I. F. transformer F.M. (T3, C45, C47, C51)
71848	Transformer—Second I. F. transformer A.M. (T4, C46, C48, C49, C50)
71849	Transformer—Third I. F. transformer F.M. (T5, C56, C57)
71935	Transformer—Driver transformer (T6, C70)
71934	Transformer—Ratio detector transformer (T7, C72, C74)
37435	Washer—"C" washer for holding threaded bushing to selector switch shaft
31608	Washer—Spring washer for idler and drive cord pulleys
2917	Washer—Spring washer for selector switch coupling shaft and bushing (knob end) and manual tuning shaft
71810	Window—Dial window
	AMPLIFIER ASSEMBLIES **RS 123**
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C5, C6)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C3, C4)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C7)
31323	Capacitor—Electrolytic, 16 mfd., 150 volts (C2)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 50 mfd., 400 volts and 1 section of 40 mfd., 25 volts (C1A, C1B, C1C)
18469	Insulator—Mounting insulator for electrolytic capacitor
11765	Lamp—Pilot lamp, Mazda #51
12493	Plug—5 contact female plug for speaker cable
71660	Resistor—Voltage divider, comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts and 1 section of 2760 ohms, 9.3 watts (R1C, R1B, R1A)
	Resistor—Fixed composition, 2700 ohms ±10%, ½ watt (R3)
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R4)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R5)
	Resistor—Fixed composition, 56,000 ohms ±10%, ½ watt (R2)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R6, R7)
35787	Socket—Audio input socket (J2)
31364	Socket—Pilot lamp socket
71659	Socket—9 prong power socket (J1)
31319	Socket—Tube socket
37048	Transformer—Power transformer, 117 volt 50-60 cycle (T1)
71661	Transformer—Output transformer (T2)
	SPEAKER ASSEMBLIES **92567-2W** **RL70R1**
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil—1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5 prong male plug for speaker
71144	Speaker—12" EM speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71864	Antenna—Di-pole antenna
72599	Back—Cabinet back for 612V1—for center
72598	Back—Cabinet back for 612V1—sides (2 required)
72590	Back—Cabinet back for 612V3—for center
72579	Back—Cabinet back for 612V3—sides (2 required)
70160	Back—Cabinet back—mahogany—for sides (2 required)—for 612V4
70162	Back—Cabinet back—mahogany—for center—for 612V4
70161	Back—Cabinet back—walnut—for sides (2 required)—for 612V4
70163	Back—Cabinet back—walnut—for center—for 612V4
71888	Bottom—Bottom cover (pan) for rollout mechanism
36639	Bracket—Pilot lamp bracket
71874	Bushing—Bushing and washer for large knobs (4 required)

STOCK No.	DESCRIPTION
72899	Button—Plug button for rollout assembly sides (2 required)
71884	Button—Push button
72447	Cable—Shielded audio cable complete with plugs
71863	Cable—5 wire moulded antenna lead-in cable
38684	Capacitor—Mica trimmer, on loop, 2-20 mmf. (C1)
X1617	Cloth—Grille cloth for 612V1—wal. or mahog. cabinets
X1624	Cloth—Grille cloth for 612V1—blonde cabinets
X1620	Cloth—Grille cloth—upper—for 612V3—wal. or mahog. cabinet
X1621	Cloth—Grille cloth—lower—for 612V3—wal. or mahog. cabinets
X1628	Cloth—Grille cloth—upper—for 612V3—blonde cabinet
X1629	Cloth—Grille cloth—lower—for 612V3—blonde cabinet
X1667	Cloth—Grille cloth for 612V4
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA-Victor)
71876	Escutcheon—Escutcheon only less screen, window and marker strips for walnut instruments
71877	Escutcheon—Escutcheon only less screen, window and marker strips for mahogany instruments
71868	Frame—Mounting frame and bracket
71943	Grille—Metal grille—upper—for 612V3
71944	Grille—Metal grille—lower—for 612V3
70165	Grille—Metal grille for 612V4
72069	Grommet—Rubber grommet for mounting loop brackets—part of loop (2 required)
72763	Handle—Pull handle for rollout mechanism
73031	Hinge—Door hinge L.H. for 612V1 (2 required)
73032	Hinge—Door hinge R.H. for 612V1 (2 required)
71945	Hinge—Door hinge for 612V3—wal. or mahog. cabinets and 612V4 record storage compartment doors (4 required)
73004	Hinge—Door hinge for 612V3—blonde cabinet (4 required)
71764	Hinge—Drop door hinge for 612V1 and wal. or mahog. 612V3 cabinets (2 required)
73001	Hinge—Drop door hinge for 612V3 blonde cabinet (2 required)
73024	Hinge—Drop door hinge for 612V4 (2 required)
70167	Hinge—Speaker compartment door hinge L.H. for 612V4 (2 required)
70166	Hinge—Speaker compartment door hinge R.H. for 612V4 (2 required)
13103	Jewel—Pilot lamp cap
71883	Knob—Tone control knob for wal. or mahog. cabinets
72761	Knob—Tone control knob for blonde cabinet
71821	Knob—Volume control, power switch, selector switch or tuning knob for wal. or mahog. cabinets
72118	Knob—Volume control, power switch, selector switch or tuning knob for blonde cabinets
11765	Lamp—Pilot lamp
71862	Loop—Antenna loop complete (L1, L15, C1)
71969	Marker—Call letter markers
72765	Nut—Speed nut to fasten transparent screen to escutcheon (2 required)
71879	Plate—Backing plate for transparent screen
71881	Plate—Call letter marker plate
72764	Plate—Backing plates (1 set) for pullout handle
30868	Plug—2 contact female plug for power cable
71967	Plug—9 contact female plug for power cable
32641	Plug—3 prong male plug for loop cable
71968	Plug—9 prong male plug for power cable
31048	Plug—Pin plug for audio cable (2 required)
71890	Pull—Door pull for 612V1 (2 required)
71946	Pull—Door pull for 612V3
73034	Pull—Door pull for 612V4
71891	Pull—Drop door pull for 612V1
71873	Retainer—Rubber retainer to mount record changer (2 required)
71878	Screen—Transparent screen
36422	Socket—3 contact female socket for loop cable
38873	Spring—Conical spring to mount record changer (4 required)
71867	Spring—Retaining spring for push button
30900	Spring—Retaining spring for knobs
71869	Spring—Braking spring for right rear wheel (612V1 and 612V3 early prod.)
71870	Spring—Braking spring for left rear wheel (612V1 and 612V3 early prod.)
71865	Spring—Spring to hold flexible cable from mechanism
71866	Stop—Rollout carriage stop consisting of disc, rubber sleeve and spacer
73069	Stop—Drop door fall supports metal stop for 612V4
70164	Stop—Stop for drop door for 612V4
72396	Stop—Stop for speaker compartment doors for 612V4
71892	Strike—Cabinet doors strike and catch
71880	Strip—Backing strip for call letter marker plate
71889	Support—Drop door fall support—for 612V1 (2 required)
72999	Support—Drop door fall support—R.H.—for 612V3 wal. or mahog. cabinets
73000	Support—Drop door fall support—L.H.—for 612V3 wal. or mahog. cabinets
73002	Support—Drop door fall support—R.H.—for 612V3 blonde cabinet
73003	Support—Drop door fall support—L.H.—for 612V3 blonde cabinet
72940	Support—Drop door fall support—L.H. for 612V4
72939	Support—Drop door fall support—R.H. for 612V4
71872	Tire—Rubber tire for front rollout wheels
71871	Tire—Rubber tire for rear rollout wheels
2917	Washer—"C" washer for rubber retainer (2 required)
71875	Washer—Spring washer for fastening front wheels and late production rear wheels
71887	Wheel—Front wheel and tire assembly (2 required)
72858	Wheel—Rear wheel and tire assembly (2 required)—late production only
71886	Wheel—Left rear wheel complete with braking mechanism, less braking spring #71870
71885	Wheel—Right rear wheel complete with braking mechanism, less braking spring #71869
71882	Window—Window for call letter markers

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

960001 Series

Automatic Record Changer

SERVICE DATA

—1945 No. 12—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

PH 36

Instruments Using 960001 Record Changer

960001-1	Models 58V, 58AV, 641TV
960001-2	Models 59V1, 59AV1
960001-3	
960001-4	Models QU-61, QU-62
960001-5	Models 610V1, 610V2, 711V2
960001-6	Models 610V2 (Blonde), 641TV (Blonde)

Manual Operation

Old, odd sized and home recording records should be played in "Manual" position.

1. Lift and turn selector arm until selector arms point outward as for unloading records.
2. Place records to be played on turntable and move control knob to "Manual" position.
3. Place pickup on record.
4. When selection is finished playing, return the tone arm to rest position and move control knob to "off" position.

   Note: Do not move control knob to "off" position before placing tone arm in rest position, or cycling will result. If this should occur do not handle tone arm. Place control knob in automatic position and allow cycle to continue until tone arm comes to rest before continuing with manual operation.

Cautions

1. Never use force to stop or rotate turntable or any other part of the mechanism.
2. Do not play a chipped or cracked record as damage to sapphire may result.
3. Warped records may slide upon one another while playing and cause unsatisfactory reproduction.
4. Do not attempt to handle tone arm while mechanism is in cycle.
5. Do not allow records to remain on selector arms when not in use, particularly in warm climate.
6. Do not allow oil or grease to come in contact with the rubber tire on drive idler or any other rubber parts.
7. Do not attempt to move the tone arm horizontally when in the rest position, unless control knob is in the manual position.

Lubrication

1. **GREASE**—Gears, all cams on large gear, tapered end of tone arm latch and tone arm lever with LUBRIPLATE #105 (Lubriplate Corp., 3211 South Wood St., Chicago).
2. **OIL**—All shafts before inserting into bearing and all moving parts, except those to be greased, with AIRCRAFT INSTRUMENT AND MACHINE GUN OIL, SPEC. 2-27E (Delta Oil Products, Milwaukee, Wis.).

Note: Keep grease and oil away from rubber parts such as drive idler, bumpers, etc.

Do not oil or grease clutch engagement lever.

Features

1. This record changer is a two post drop type, non-intermixing mechanism designed to play automatically a series of twelve 10-inch or ten 12-inch records of the standard 78 RPM type.
2. The mechanism uses a light weight, low noise, crystal pickup cartridge, equipped with a long life sapphire point.
3. The tone arm is automatically returned to the rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric and closed circle tripping device.
5. A pickup shorting switch is incorporated which shorts out the pickup during record change cycle. This prevents noise from gears, cams and other moving parts from being amplified through the reproducing system.

   960001-2, -3 and -4 have an additional pickup shorting switch which contacts roller on tone arm lever (17) and shorts out pickup while tone arm is in the rest position.
6. The mechanical linkage between record support posts makes possible a single and simple operation on the part of the operator to change from 10 to 12-inch records or vice versa.
7. This changer when equipped with motor #L230270 may be converted to 50-cycle operation by the addition of Stock No. 71137 Spring to the motor drive shaft.

   Caution: Only motor #L230270 is suitable for use on 50-cycle power supply.
8. All gears and cams are disconnected while the records are being played. This removes the load on the motor and eliminates excessive friction and noise from moving parts which otherwise have a tendency to produce wow or rumble.

Automatic Operation

1. Lift and turn the selector arm #1 in the front right-hand corner of the changer panel to a position engaging the slots in the selector sleeve. In so doing the arrows and numbers designating record size should be pointing toward the turntable spindle.
2. Load the records to be played on the separator arms with the desired selections upward and in the proper sequence. The last record should be on top.
3. Move control knob to "reject" position and release it. The changer will play the selections in the entire stack at which time the control knob will return to "off" position automatically.
4. Lift and turn the selector arm to facilitate the removal of records on turntable.

   Note: To stop mechanism before the selections in the entire stack have been played, move the control knob to "off" position, remove records on selector arms and lift and move the tone arm to rest position.

Functions of Main Parts

I. Motor

The function of the motor is to serve as a power source for the changer. Power is transmitted from motor to turntable through the rubber-tired idler wheel.

II. Control slide and associate parts

A. General function is to provide a single knob control for the various operations shown on the escutcheon plate through its interaction with the changer mechanism.

B. The power switch is mechanically operated by the control slide through a linkage to correspond to the various positions on the escutcheon plate.

C. Manual Reject Slide (27), fig. (3)

1. Manual position—With the control slide in the "manual" position the formed end of the reject slide (27) fig. (16) engages the clutch engagement lever (33) and holds it in an up position so that the trip mechanism is inoperative.
2. Reject position—The short formed end of the reject slide (27), near the mid-section, contacts part of trip lever (28) and trips the mechanism.

D. Tone Arm Latch (14), fig. (3)

1. Functions as a positive lock, fig. (12), for the tone arm whenever the latter is moved to the outside of the panel in all positions of the control slide other than "manual".
2. Also functions as a partial lock, fig. (12), or detent, for the tone arm lever (17) while the control slide is in "manual".

E. Manual Lock Out (4), fig. (3)

Function is to engage and retain the tone arm locator (16), fig. (15), in its outermost position while the control slide is set in the "manual" position.

F. 10 and 12-Inch Set Lever (19), fig. (3)

Function is to index the tone arm properly for 10 or 12-inch records, fig. (19).

III. Spindle Housing, Gear Assembly, and Associated Parts

These two main castings are assembled with other component parts into a major sub-assembly, which includes a spindle and pinion. The assembly operates only in a counter-clockwise direction (viewed from bottom side) and provides a clutching and driving action for all automatic operation. Large gear rotates in a clockwise direction (viewed from bottom). One revolution of this large gear carries the mechanism through a complete change cycle.

A. Pinion Gear (37), fig. (5)

1. Operates as part of the clutch.
2. Operates as a gear to drive the main gear through a change cycle.
3. Serves as a vertical stop for the spindle to which it is pinned.

B. Clutch Engagement Lever (33), fig. (5)

1. Function is to engage projection on pinion gear to start change cycle.

C. Trip Lever Assembly (28), fig. (4)

1 Function is to hold the clutch engagement lever (33), fig. (4) in a position such that it clears the pinion gear (37), fig. (5), except when tripping for cycling.

IV. Selector Arm and Blades

1. Function is to support the records and, together with the selector blades, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

V. Tone Arm Lever and Associated Parts

A. Tone Arm Lever (17), fig. (3)

Controls the horizontal movement of the tone arm.

B. Tone Arm Locator Lever (16), fig. (3)

Function is to control the tone arm lever in determining landing position of the pickup, fig. (8).

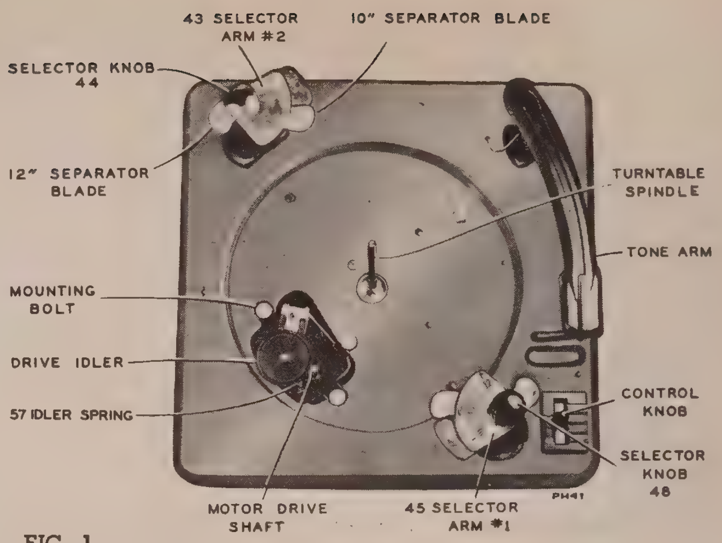


FIG. 1

C. Booster Spring (67), fig. (3)

A small piece of round spring wire which provides a limited amount of spring tension inward, tending to push the pickup into the starting groove.

VI. Tone Arm Lift Pin (51), fig. (24)

Function is to control vertical motion of tone arm.

VII. Selector or Support Arm Gears (35), (36), fig. (3)

Function is to transmit energy from drive mechanism to selector arm and knives.

VIII. Trip Plate (Knurled) (30), fig. (3)

Contacts trip dog (31), fig. (4), for eccentric tripping.

IX. Trip Shoe (29), fig. (3)

Functions as part of the closed circle tripping device.

X. Segments (23), (25) and Tie Plate (24), fig. (3)

Constitute the mechanical linkage between separator arms.

XI. Drive Gear Stop Lever (34), fig. (6)

Functions to stop and position drive gear after cycling.

XII. Tone Arm Retard Lever (26), fig. (4)

Stabilizes horizontal movement of tone arm while in cycle.

Miscellaneous Service Hints

1. Rumble

A. Remove turntable by lifting straight up and inspect the drive mechanism for a defective idler wheel. (Rough rubber tire or very sloppy bearing.)

B. Inspect the mounting of the changer to determine whether or not the mounting clamp nuts have been loosened.

C. Check and replace any microphonic tubes in the reproducing system.

2. "Wow" or Speed Variation

A. Make certain the turntable is free to rotate and not rubbing on motor board or portion of drive mechanism.

B. With the mechanism out of cycle remove the turntable by lifting straight up. The spindle being disengaged from all portions of the drive mechanism should rotate freely when turned by hand.

C. Check for badly worn idler as described in Item (1A).

D. Check for presence of grease on rubber tire of drive idler and the inner rim of the turntable. (Naphtha or carbontetrachloride will remove harmful grease.)

E. Bent turntable spindle.

F. Insufficient tension of drive idler spring (57), fig. (1).

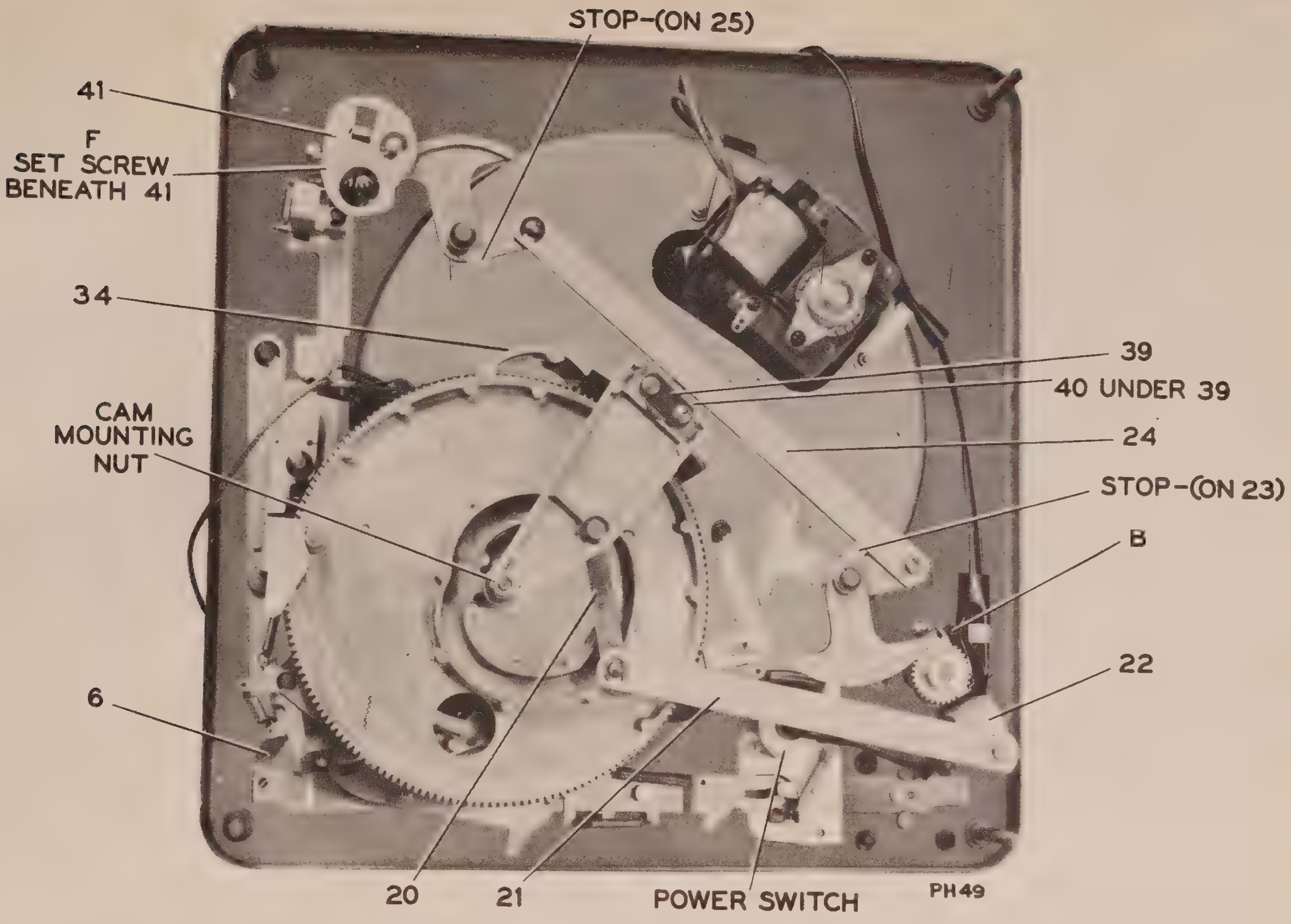

STOP-(ON 25)
41
F
SET SCREW
BENEATH 41
34
CAM
MOUNTING
NUT
6
39
40 UNDER 39
24
STOP-(ON 23)
B
22
20
21
POWER SWITCH
PH49

FIG. 2

3. Continuous Tripping (see sketches below)

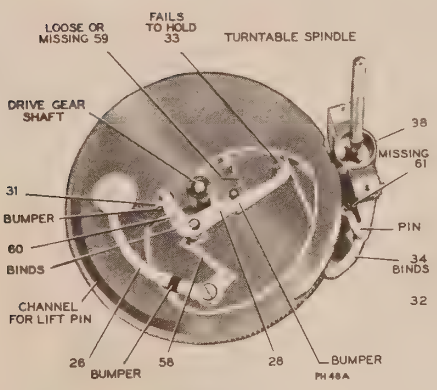
A. Trip lever (28) fails to hold clutch engagement lever (33).

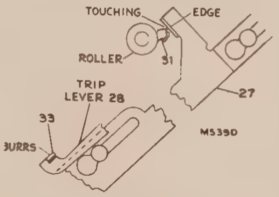
  a. Loose or missing trip lever spring (59).
  b. Bind in trip lever bearing.
  c. Formed edge on manual reject slide (27) touching trip dog (31) (bend away).

B. Bind in stop lever (34), fig. (2).

C. Missing stop lever spring (61).

D. Control knob fails to return to automatic position due to bind in control slide, and associated parts. Missing spring (64), fig. (3).


LOOSE OR MISSING 59
FAILS TO HOLD 33
TURNTABLE SPINDLE
DRIVE GEAR SHAFT
31
BUMPER
60
BINDS
CHANNEL FOR LIFT PIN
26
BUMPER
58
28
BUMPER
38
MISSING 61
PIN
34 BINDS
32
PH 48A


TOUCHING
EDGE
ROLLER
31
27
TRIP LEVER 28
33
BURRS
MS39D

4. Feed-back or Howl

This condition is caused by sound from the speaker getting back into the input of the amplifier.

A. Inspect motor board mounting to determine whether the clamp nuts have been loosened.

B. Make certain no portion of the mechanism is touching the cabinet. The mechanism should be free floating on mounting springs.

C. Check and replace any microphonic tube in reproducing system.

5. Failure to Trip (see sketches below)

A. Pickup jumping grooves due to improper pickup pressure, or foreign material clogging up sapphire guard.

B. Bind in trip dog (31), bearing or missing spring (60).

C. Tripping adjustments improperly set.

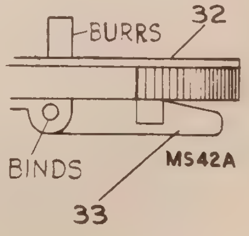
D. Trip lever spring (59) having too much tension.

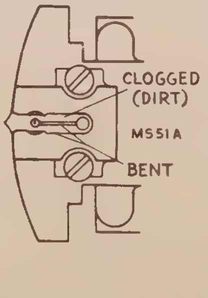
E. Burrs on trip lever (28).

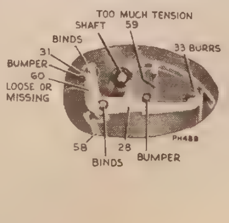
F. Bind in trip lever bearing.

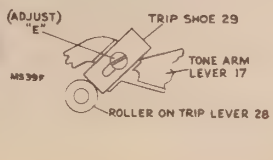
G. Bind in tone arm bearing.

H. Clutch engagement lever (33) bent or binding. (It should be free to drop under its own weight when disengaged from trip lever.)


BURRS
32
BINDS
MS42A
33


CLOGGED (DIRT)
MS51A
BENT


TOO MUCH TENSION
SHAFT
59
BINDS
31
BUMPER
60
LOOSE OR MISSING
33 BURRS
58
BINDS
28
BUMPER
PH48B


(ADJUST) "E"
TRIP SHOE 29
TONE ARM LEVER 17
MS39F
ROLLER ON TRIP LEVER 28

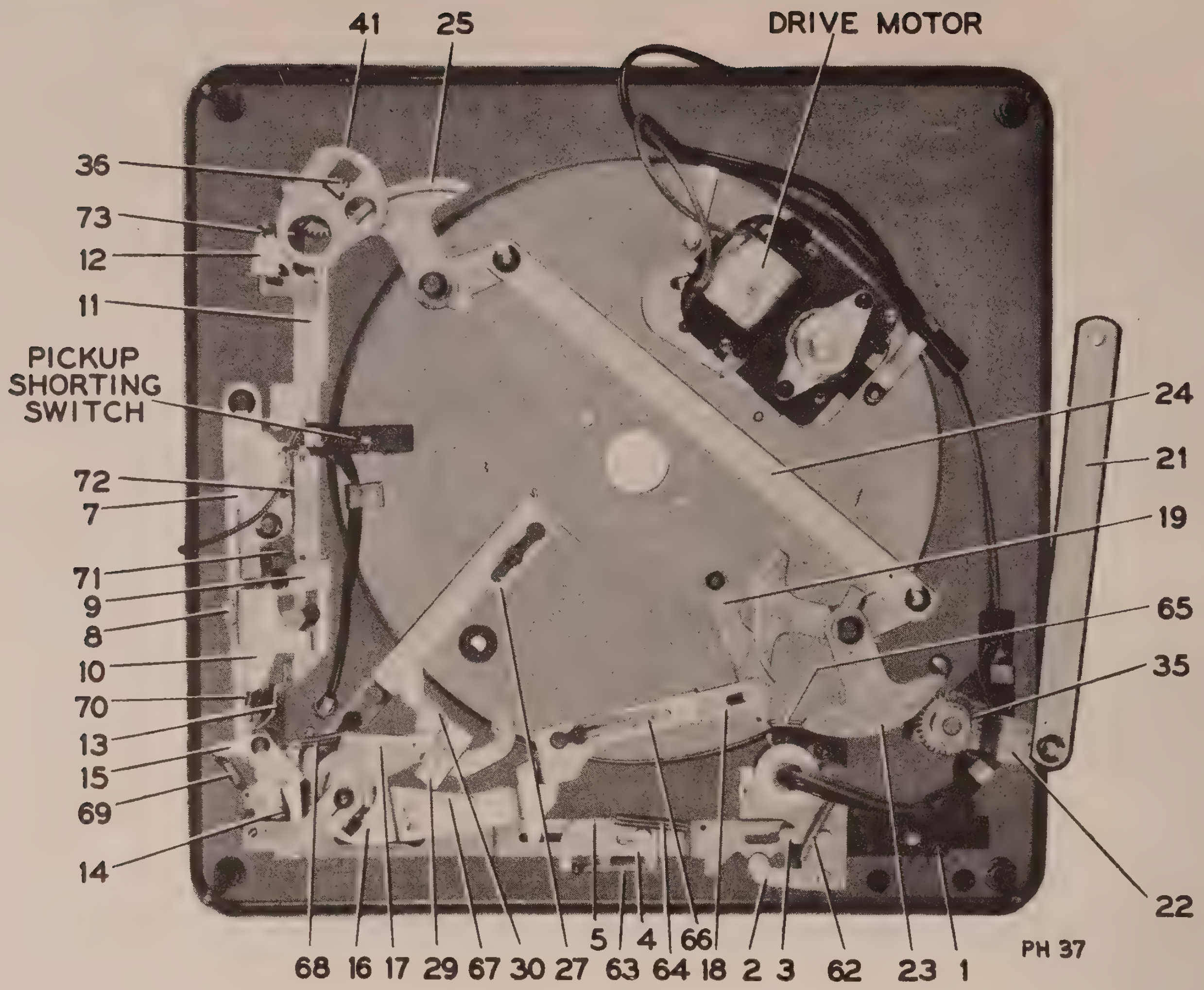

41
25
DRIVE MOTOR
36
73
12
11
PICKUP SHORTING SWITCH
72
7
71
9
8
10
70
13
15
69
14
24
21
19
65
35
22
68
16
17
29
67
30
27
5
63
4
64
66
18
2
3
62
23
1
PH 37

FIG. 3

6. Insufficient power to complete cycle.

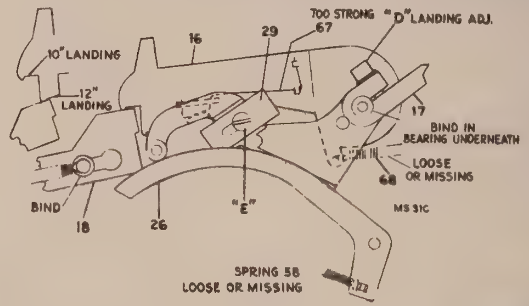
- A. Grease or oil on inner rim of turntable and rubber tire idler.
- B. Insufficient tension of spring (57), fig. (1), on drive idler.
- C. Defective drive motor.
- D. Binding in series of levers, pivots, etc.
  - a. Drive link assembly (20), fig. (2).
  - b. Selector arm shaft assembly, fig. (1).
  - c. Drive gear (32), fig. (4), shaft.
  - d. Poor gear mesh due to misalignment or defective teeth.
  - e. Bent record separator blades causing a jam, fig. (1).

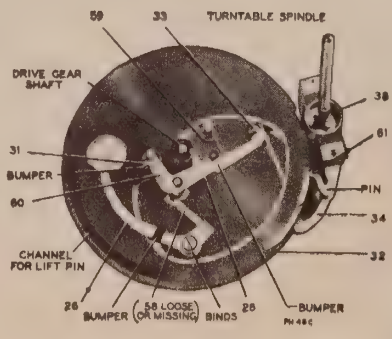
7. Records do not drop properly.

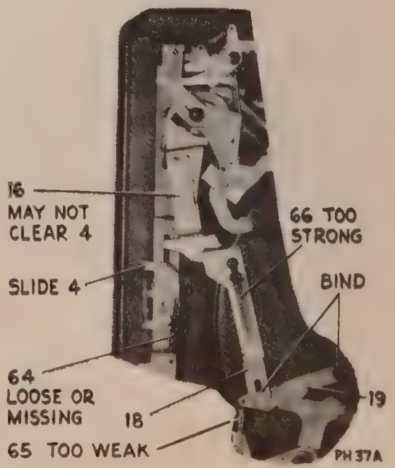
- A. Separator arms improperly timed. (See timing adjustments.)
- B. Bent separator blades.
- C. Bent turntable spindle.

8. Improper pickup landing (adjacent sketches)

- A. Landing adjustment improperly set.
- B. Bind in tone arm bearing.
- C. Bind of slide (18) and lever (19) on studs.
- D. Missing spring (65) or (66).
- E. Bent or improperly shaped lever (16).
- F. Missing or loose spring (68).
- G. Spring (66) having more tension than spring (65).
- H. Spring (67) out of position causing false edge on lever (16).
- I. Tone arm fails to move in because of bind in slide (4), or missing spring (64) keeping lever (16) latched.


TOO STRONG
"D" LANDING ADJ.
67
16
29
10" LANDING
12" LANDING
17
BIND IN BEARING UNDERNEATH
LOOSE OR MISSING
68
BIND
18
26
"E"
MS 31C
SPRING 58 LOOSE OR MISSING


59
33
TURNTABLE SPINDLE
DRIVE GEAR SHAFT
38
61
31
BUMPER
60
PIN
34
32
CHANNEL FOR LIFT PIN
26
BUMPER
(58 LOOSE OR MISSING)
BINDS
28
BUMPER
PH 48C


16
MAY NOT CLEAR 4
66 TOO STRONG
SLIDE 4
BIND
64
LOOSE OR MISSING
19
18
65 TOO WEAK
PH 37A

(Continued)

Automatic Cycle of Operation

Function	Explanation
Lift and turn selector arm as required for 10- or 12-inch records. Place stack of records on arms.	1. The rotation of selector arm #1 moves selector arm #2 through the mechanical linkage of gear (35), fig. (19), segment (23), tie plate (24), segment (25) and gear (36). 2. Portion of segment (23), fig. (19), sildes against set lever (19) thereby determining the point of contact of slide (18), fig. (8), with tone arm locator (16), which in turn governs the pickup landing position.
Push control lever to reject position and release.	1. Control slide (1), fig. (3), actuates manual reject slide (27) through coupling link (6), fig. (2). 2. Manual reject slide (27), fig. (3), pushes against stud above small roller on trip lever (28), fig. (4). 3. The action of trip lever (28), fig. (4), unlatches clutch engagement lever (33) allowing it to drop and engage projection on pinion gear (37), fig. (5). This engagement between lever (33) and pinion gear (37) causes the teeth of drive gear (32) to engage the teeth of pinion gear (37) starting cycle.
Drive gear (32) rotates.	1. Gear (32), fig. (6), rotates with stop lever (34), leaving notch and at the same time pickup shorting switch leaving raised portion of gear causing it to close, shorting out the pickup. 2. Roller on drive link (20), fig. (19), follows channel in drive cam. 3. Energy is transferred from drive link (20) to separator arm #1 through drive link (21), arm (22) and sleeve (47), fig. (17). 4. Separator arm #1 connected to gear (35), fig. (19), starts rotating. 5. Separator arm #2 mechanically linked through gear (35), segment (23), tie plate (24), segment (25) and gear (36) follows in rotation.
Tone arm moves out.	1. As the channel cut in rotating gear (32), fig. (9), moves, lift pin (51) raises contacting adjustment screw "A", fig. (24), on tone arm and raising tone arm. 2. Roller located on end of tone arm lever (17), fig. (8), comes in contact with portion of cam on gear (32), fig. (4), and is pushed outward and against tone arm locator lever (16), fig. (8), which is held under tension of spring (68). 3. Tone arm is locked by tone arm latch (14), fig. (12), and held from being pushed in by locator lever (16), fig. (8). 4. As drive gear continues to rotate, clutch engagement lever (33), fig. (5), is returned to normal position by sliding against edge of tone arm lever (17), fig. (8), as gear supporting it passes by.
Separator arms rotate and drop record to turntable.	1. Blades separate lower record from stack and support the stack while the record is being dropped. 2. Record drops. 3. Tone arm lever (17) is unlatched from latch (14), fig. (7), due to latch (15) making a momentary contact with raised portion of gear.
Tone arm moves in.	1. Tone arm lever (17), fig. (8), which is connected to tone arm is being moved in by locator lever (16) which is working under the tension of spring (68). During this motion tone arm lever (17) is stabilized by tone arm retard lever (26) until locator lever (16) engages slide (18) to determine 10- or 12-inch landing position. 2. Pickup is lowered to the record by lift pin (51), fig. (9), moving into channel in gear. 3. An instant before rotating gear comes to the rest position and stop lever (34), fig. (4), engages notch in gear (32), the pickup shorting switch is opened due to the blade coming in contact with raised portion of gear (32). 4. As pickup is landing and gear is returning to normal position the stud located on underside of gear (32) pushes shut-off bracket (10), fig. (13), outward. The action at this point is not transferred since shut-off dog (8), fig. (10), and shut-off trip (9) are not latched thereby allowing shut-off bracket (10) to slip by over the curved portion of the shut-off dog (8). If shut-off bracket (10) should contact straight edge of shut-off dog (8) as it does when latched to shut-off trip (9), shut-off lever (7) would pull slide (1), fig. (3), and remove power from drive motor. 5. The instant pickup lands, feed-in spring (67), fig. (8), pushes pickup into starting groove.

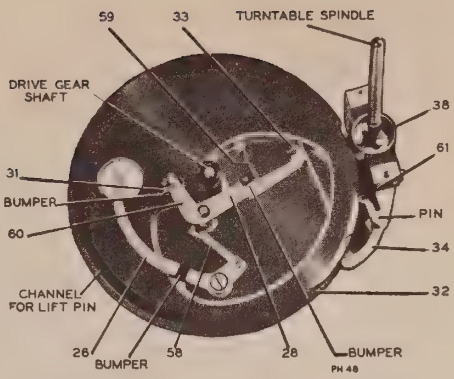


FIG. 4

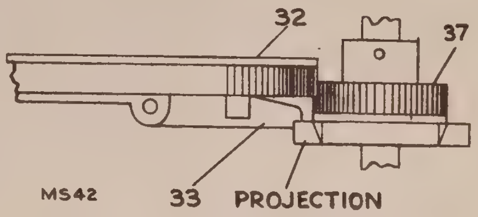


FIG. 5

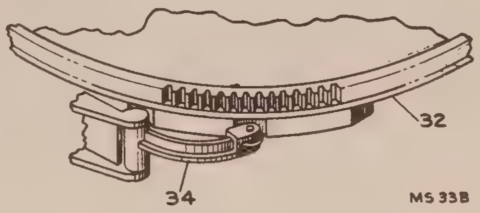


FIG. 6

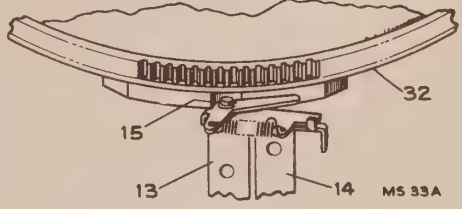


FIG. 7

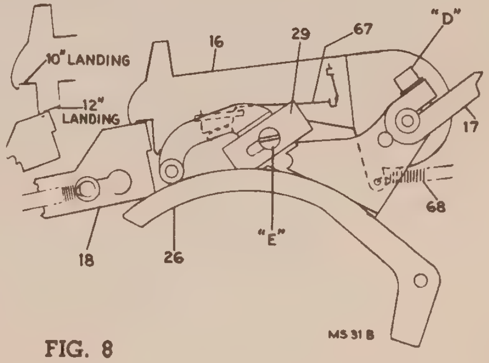


FIG. 8

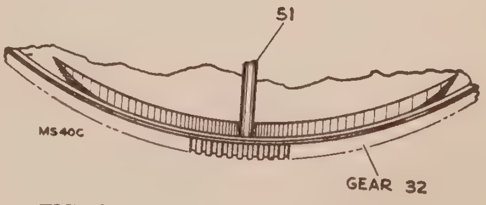


FIG. 9

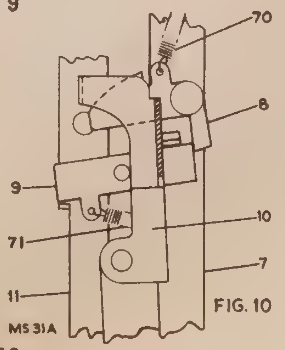


FIG. 10

Function	Explanation
Record plays.	1. Pickup moves toward center of record and into trip groove. 2. In the case of an eccentric groove the tone arm lever (17), fig. (3), moves in and the trip plate (30), fig. (4), engages trip dog (31) moving trip lever (28) and starting cycle. 3. In the case of a record with a closed circle trip the trip shoe (29), fig. (23), pushes against roller on trip lever (28), fig. (4), thus starting cycle.
Mechanism plays entire stack automatically.	Separating and dropping records, tripping, etc.
Last record has dropped and record plays.	1. Up to this time shut-off cam (41), fig. (21), located on bottom end of selector arm #2 has been held up by weight of records on selector arm applying pressure on the small raised portion of shut-off selector bracket (50), fig. (20), which is protruding through selector arm. 2. Pickup moves into trip, and drive gear (32), fig. (4), starts rotating. 3. Since cam (41), fig. (11), has dropped and is rotating with selector arm #2 its surface contacts stud on shut-off slide bracket (12). This transmits energy to shut-off slide (11), fig. (14), which permits shut-off dog (8) and shut-off trip (9) to latch. 4. Shut-off slide (11), fig. (12), locks tone arm latch (13) during the time, portion of the rotating drive gear is contacting tone arm latch (15), fig. (7), and tending to unlatch it. The tone arm remaining latched, prevents it from being pushed in by locator lever (16), fig. (8). 5. Tone arm is lowered to rest as lift pin (51), fig. (9), goes into channel in gear (32). 6. As gear (32) comes to rest stud, fig. (13), located on underside of gear (32) contacts and pushes shut-off bracket (10) outward. Since shut-off dog (8), fig. (14), and shut-off trip (9) are latched, shut-off bracket (10) contacts flat surface of shut-off dog (8) pushing shut-off lever (7) outward. 7. Shut-off lever (7) in its outward movement contacts lip on slide (1), fig. (3), pulling control knob to "off" position, cutting off the power to the drive motor. During this action, shut-off dog (8), fig. (14), and shut-off trip (9) are unlatched.

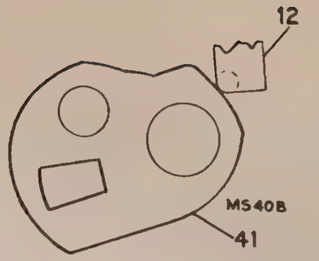


FIG. 11

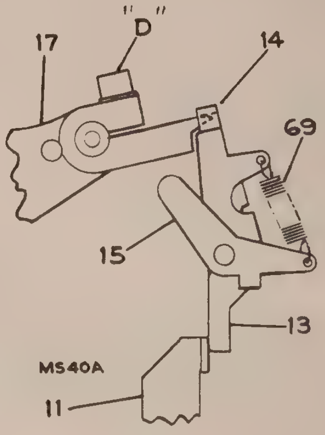


FIG. 12

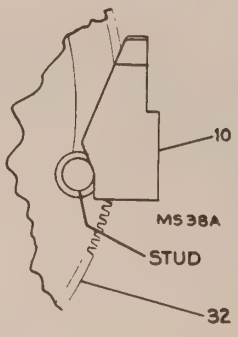


FIG. 13

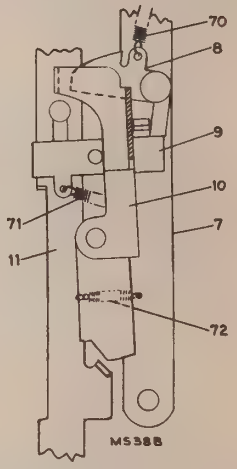


FIG. 14

Manual Cycle

Function	Explanation
Push control knob to manual.	1. Slide (1), fig. (3), supporting control knob moves and positions "manual" lock-out slides (4) and (5), fig. 15), so as to have slide (4) engage and hold tone arm locator (16) and prevent it from pushing tone arm lever (17), fig. (8), in for pickup landing. 2. Slide (1), fig. (3), also energizing manual reject slide (27), fig. (16), so as to have the lip on slide (27) push against tone arm latch (14), moving the point of contact on tone arm lever (17) to the very edge. This permits tone arm lever (17) to slip by when tone arm is moved manually. 3. The movement of manual reject slide (27) has so positioned the slide so as to lock the clutch engagement lever (33) and prevent it from engaging offset in pinion gear (37), fig. (5), when trip lever (28), fig. (16), is moved. 4. All portions of the cycling mechanism are locked during manual operation and remain stationary with the pickup shorting switch in the off position at all times, excepting Models –2 and –3 which have an additional switch, shorting out pickup when tone arm is in the rest position. Note: When operating manually the tone arm should always be returned to rest position before moving control knob to the off position. If this procedure is not followed the trip lever (28) may not hold the clutch engagement lever (33) allowing it to drop and start cycle.
Allen wrenches required for adjustments.	3/32 in. between flats, for Allen wrenches required for adjustments on set screws #10 and 12, stock #22111. 5/32 in. between flats, for 5/16 in. set screws, stock #22113. 3/16 in. between flats, for ⅜ in. set screws, stock #26581.

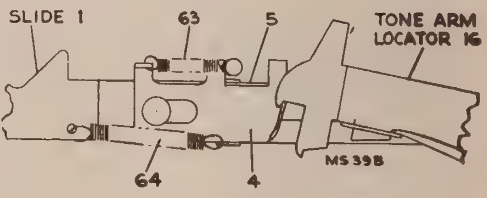


FIG. 15

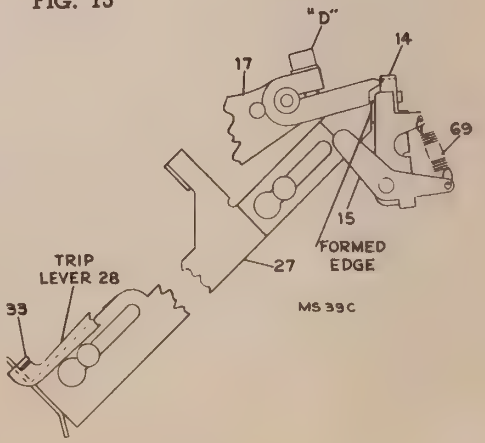


FIG. 16

Check on Timing Adjustments

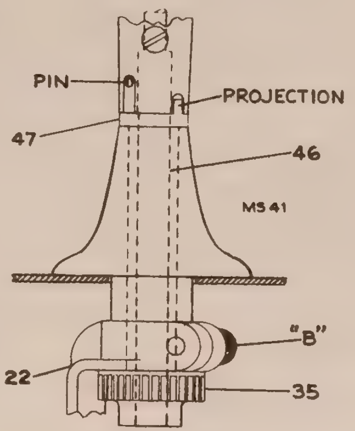
A quick check for correct timing of mechanism can be made by:

1. Have mechanism out of cycle.
2. Lift and turn separator arm #1 to 10 in. position and place a 10 in. record on arms.
3. The 10 in. separator blade should have a definite relation to record as illustrated in fig. (18) when segment (23) is against tie plate (24) as illustrated in fig. (19). If so, selector arm #1 is correctly timed.
4. If the 10 in. blades of both arms have the same distance from the record, remove record and lift and turn selector arm #1 counterclockwise as far as it will go (viewed from top).
5. Segment (25) should be against tie plate (24) when the teeth of segment (25) and gear (36) are meshed as shown in fig. (22). If this exists, timing of selector arm #2 is correct.

Timing Adjustments for Record Separators

1. Make certain mechanism is out of cycle and all parts in their proper place by comparing the mechanism with sketches and photographs.
2. Remove "C" washer on bearing of segment (23), fig. (19), and disengage the teeth of segment (23) and selector arm gear (35).
3. Selector arm #1, fig. (17), should be in place with the pin of selector shaft engaged in the large slot of selector arm and the small projection of selector arm sleeve (47) engaged in the small slot of the selector arm. Arm (22), fig. (19), should also be in place and connected to the drive link (20) and drive link connecting rod (21).
4. Loosen set screw "B", fig. (17), and wedge some object such as a screw driver in the clamp of arm (22) so as to allow free movement of selector arm sleeve (47).
5. Place 10-inch record on selector arms and turn selector arm #1, fig. (18), until the 10-inch blade is approximately ¼ inch from the edge of the record.
6. Tighten set screw "B", fig. (17).
7. Rotate the disengaged segment (23), fig. (19), clockwise until tie plate (24) comes against stop on segment (23). Hold in this position while engaging teeth of segment (23) and teeth of gear (35).
8. Replace "C" washer on segment (23).
9. Remove "C" washer on rod (41), fig. (21) (under selector arm #2) and remove cam and rod (41).
10. Remove "C" washer on bearing of segment (25), fig. (22), and disengage teeth of segment (25) and gear (36).
11. Lift and rotate selector arm #1, fig. (22), counter-clockwise until stop on segment (25) is against tie plate (24).
12. Engage teeth of segment (25) and gear (36) so as to have the first tooth of segment gear (25) engage the gear (36) between the first and second tooth next to slot as shown in sketch, fig. (22). Replace "C" washer or bearing of segment (25).
13. Loosen set screw "F" and rotate selector arm #2 until ten-inch separator blade is the same distance from the edge of the record as selector arm #1, fig. (18).
14. Tighten set screw "F", fig. (22).

    Note: Do not try to position separator arm #2 by loosening small set screws on arm proper. The factory has countersunk the shaft, seating the set screws.
15. Replace cam (41), fig. (21), with the end going up through hole in plate (50), fig. (20). Insert "C" washer, fig. (21), to hold in place.


PIN
PROJECTION
47
46
MS 41
"B"
22
35

SELECTOR ARM #1

FIG. 17

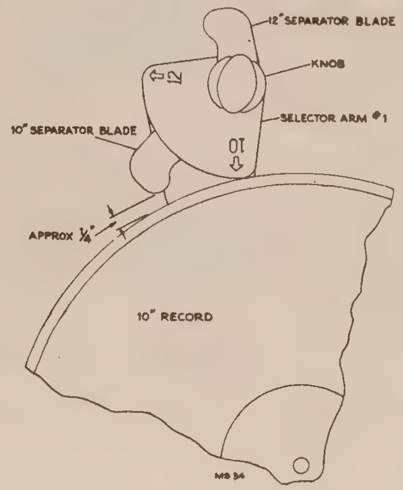

12" SEPARATOR BLADE
KNOB
12
SELECTOR ARM #1
10" SEPARATOR BLADE
10
APPROX ¼"
10" RECORD
MS 34

FIG. 18

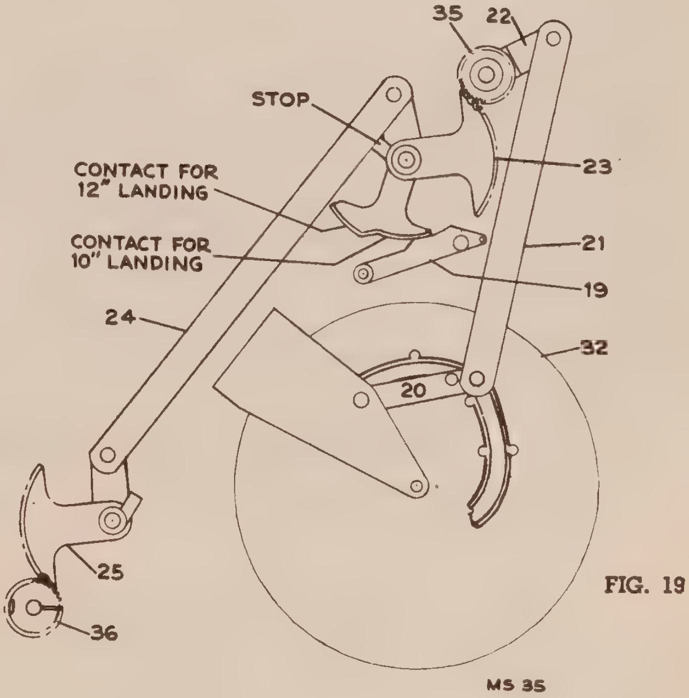
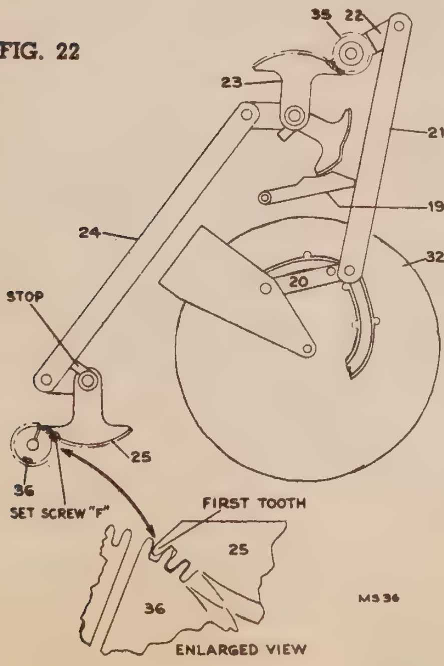
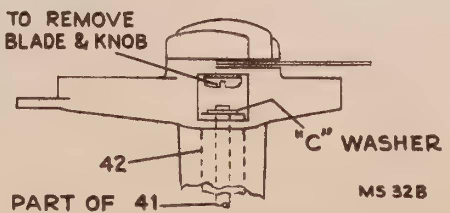

35
22
STOP
23
CONTACT FOR 12" LANDING
CONTACT FOR 10" LANDING
21
19
24
32
20
25
36
MS 35

FIG. 19

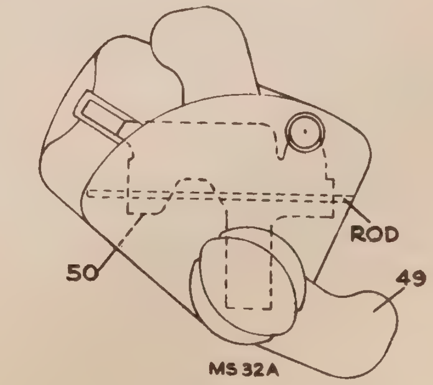
FIG. 22


35
22
23
21
19
24
32
20
STOP
25
36
SET SCREW "F"
FIRST TOOTH
25
36
ENLARGED VIEW
MS 36


TO REMOVE BLADE & KNOB
"C" WASHER
42
PART OF 41
MS 32B

SELECTOR ARM #2

FIG. 21


ROD
50
49
MS 32A

SELECTOR ARM #2

FIG. 20

Tripping Adjustment

No eccentric tripping adjustment is necessary. It is automatically adjusted when landing adjustment is made.

For closed circle trip, loosen set screw "E", fig. (23), and set trip shoe (29) so as to contact roller on trip lever (28) when the sapphire is approximately 1⅝" from side of turntable spindle.

Tone Arm Height Adjustment

1. The height of the tone arm while in the rest position is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by 1⁄16".

   The height is adjusted by bending the formed edge on lower half of tone arm bracket fig. (24).
2. Tone arm height adjustment screw "A", fig. (24), should be so adjusted to allow a clearance of 1⁄16 inch between tone arm and record on selector arm while mechanism is in cycle.

Pickup Pressure Adjustment

By the use of a pocket postal scale hooked on the sapphire end of the tone arm, loosen set screw "G", fig. (24), and move slide until tension of spring (56) allows 1 to 1¼ oz. pickup force for model 960001-2 and 1½ to 1¾ oz. for models 960001-1 and 960001-3.

Landing Adjustment

1. With the power removed from the mechanism, place a 10-inch record on the turntable and turn the selector arm to 10-inch position.
2. Push selector knob to reject and release.
3. Push down on the small section of lever (50), fig. (20), which protrudes through selector arm #2 and rotate turntable by hand until the pickup is about to land.
4. Loosen set screw "D", fig. (25).
5. Hold tone arm lever (17) against tone arm locator (16) with just enough force so as not to have tone arm locator (16) move away from slide (18).
6. While holding the position as stated in "5," move pickup to the landing point on the record. Leave very little vertical play in tone arm bearing but just enough to have free motion of tone arm. Tighten set screw "D".
7. Apply power to mechanism and test by playing through a stack of records.

Note: Twelve-inch record landing will automatically be adjusted while adjusting 10-inch landing.

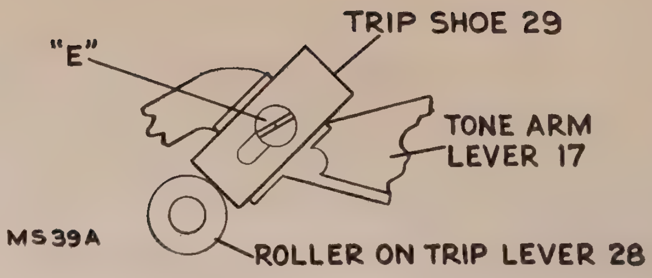

"E"
TRIP SHOE 29
TONE ARM LEVER 17
MS39A
ROLLER ON TRIP LEVER 28

FIG. 23

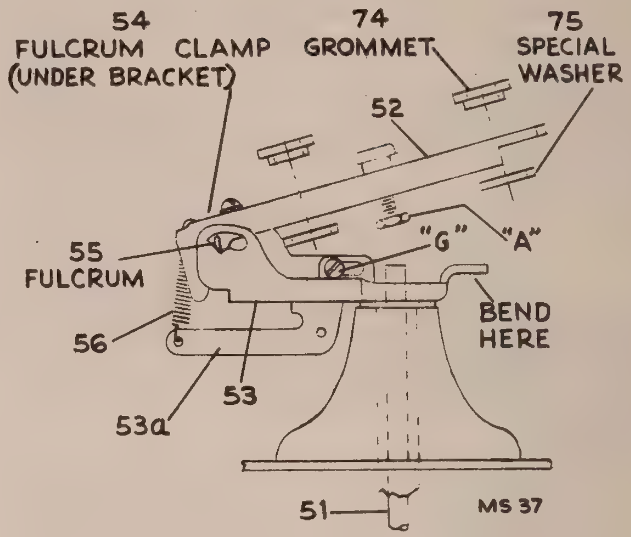

54
FULCRUM CLAMP (UNDER BRACKET)
74
GROMMET
75
SPECIAL WASHER
52
"G"
"A"
55
FULCRUM
BEND HERE
56
53
53a
51
MS 37

FIG. 24

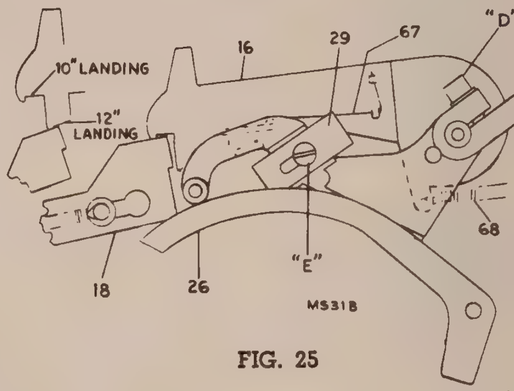

10" LANDING
12" LANDING
16
29
67
"D"
17
68
18
26
"E"
MS31B

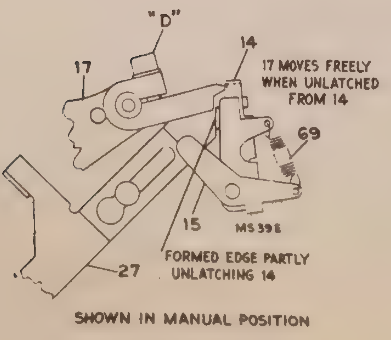
FIG. 25

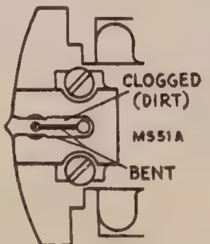
Miscellaneous Service Hints—(Continued)

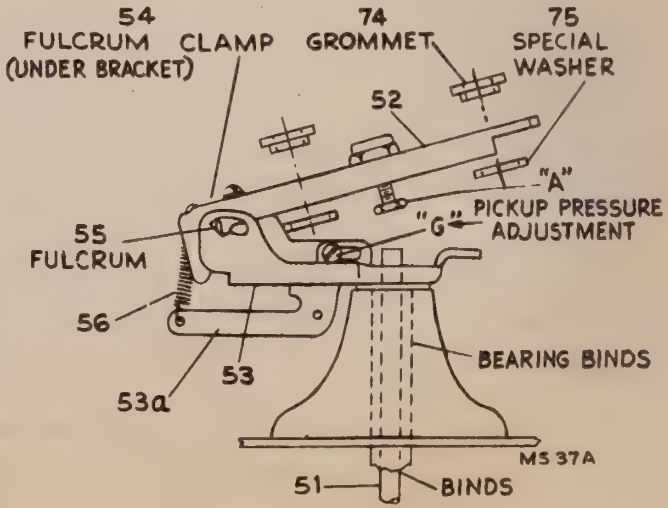
9. Repeating grooves (see sketches below)
   - A. Insufficient pickup pressure.
   - B. Bind in tone arm pivot.

     Place control knob in "manual" position and move tone arm in toward spindle and back. After the end of the tone arm lever (17) (functioning as a detent) leaves latch (14) the tone arm should have free and smooth action.

     (If latch (14) is too positive, bend formed edge on manual reject slide (27) which contacts latch (14).)
   - C. Check for bind in tone arm lift pin (51).
   - D. Sapphire shield filled with foreign material, preventing sapphire from setting into grooves.
   - E. Bent sapphire mounting thereby allowing sapphire guard to ride on record.


"D"
17
14
17 MOVES FREELY WHEN UNLATCHED FROM 14
69
15
MS39E
FORMED EDGE PARTLY UNLATCHING 14
27
SHOWN IN MANUAL POSITION


CLOGGED (DIRT)
MS51A
BENT


54
FULCRUM CLAMP (UNDER BRACKET)
74
GROMMET
75
SPECIAL WASHER
52
"A"
"G"
PICKUP PRESSURE ADJUSTMENT
55
FULCRUM
56
BEARING BINDS
53
53a
MS 37A
51
BINDS

10. Premature tripping.

A. Defective record.
B. Trip shoe (29), fig. (3), improperly set.
C. Trip lever spring (59), fig. (4), insufficient tension.
D. Bind in trip dog (31), fig. (4), pivot.

11. Noise coming from speaker during record change cycle.

Pickup shorting switch failing to short out pickup.

12. No output.

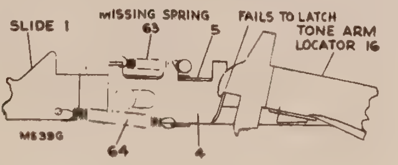
A. Defective crystal cartridge.
B. Broken or bent sapphire mounting.
C. Broken or shorted pickup cable.
D. Pickup shorting switch making contact.
E. Inoperative reproducing system.

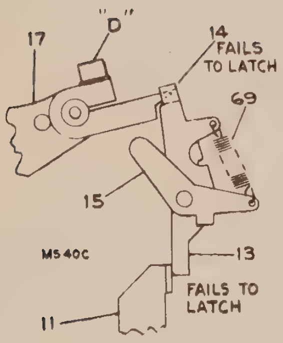
13. Distorted output.

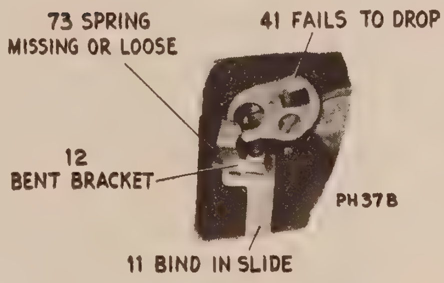
A. Defective pickup cartridge.
B. Bent or loose sapphire mounting, allowing sapphire to ride irregular in groove.
C. Sapphire guard filled with foreign material such as dust and lint which accumulates on the records while in storage.
(Remove with small brush.)

14. Tone arm fails to go to rest position at the finish of the last selection (see sketches below)

A. Control knob fails to return automatically to "off" position.
  1. Cam (41) fails to drop down, thereby preventing stud on stop bracket (12) from contacting it.
  2. Missing stop bracket spring (73).
  3. Missing stud on bracket (12).
  4. Bind in shut off dog (8), fig. (3), and trip (9).
  5. Formed edge on slide (11) not locking tone arm latch (13).
  6. Tone arm latch (14) bent thereby not locking tone arm and allowing it to be pushed in by lever (16).

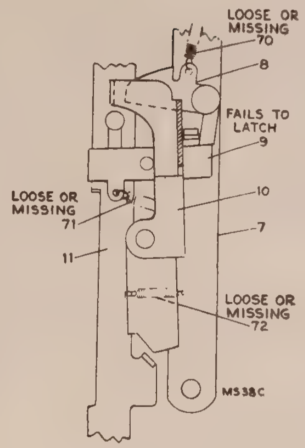

SLIDE 1
MISSING SPRING 63
5
FAILS TO LATCH
TONE ARM LOCATOR 16
MS39G
64
4

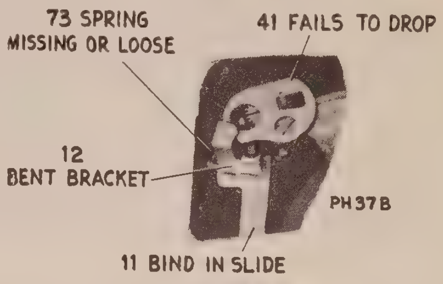

17
"D"
14
FAILS TO LATCH
69
15
MS40C
13
FAILS TO LATCH
11

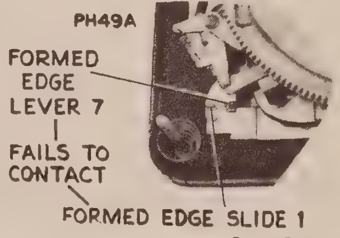

73 SPRING MISSING OR LOOSE
41 FAILS TO DROP
12 BENT BRACKET
PH37B
11 BIND IN SLIDE

15. Turntable fails to stop at the end of the last selection (see sketches below)

A. Defective motor switch.
B. Bind in levers actuating drive motor power switch, fig. (2).
C. Control lever fails to move automatically to "off" position as described in 14A—one to five.
D. Small formed edge on lever (7) may fail to contact formed edge on slide (1) thereby not pulling slide (1) and not moving control to "off" position.

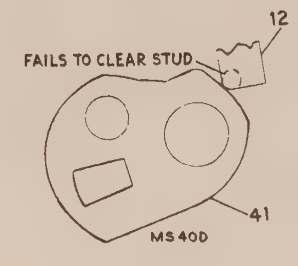

LOOSE OR MISSING 70
8
FAILS TO LATCH
9
LOOSE OR MISSING 71
10
7
11
LOOSE OR MISSING 72
MS38C

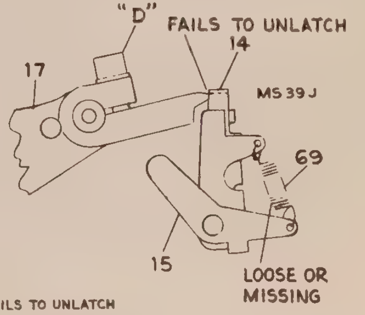

73 SPRING MISSING OR LOOSE
41 FAILS TO DROP
12 BENT BRACKET
PH37B
11 BIND IN SLIDE

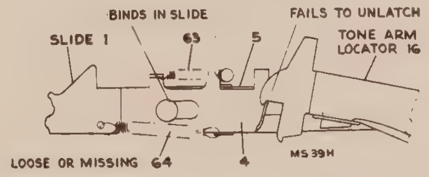

PH49A
FORMED EDGE LEVER 7
FAILS TO CONTACT
FORMED EDGE SLIDE 1

16. Pickup fails to move in for landing (see sketches below)

A. Tone arm locator (16) lever fails to unlatch from slide (4).
B. Tone arm lever (17) fails to unlatch from tone arm latch (14).
C. Missing spring (69).
D. Bent shut off slide bracket (12) which may allow cam (41) to contact at incorrect time.
E. Weak or missing spring (73), fig. (3), thus allowing slide (11) to move in and lock latch (13).


12
FAILS TO CLEAR STUD
41
MS40D


"D"
FAILS TO UNLATCH
14
17
MS39J
69
15
LOOSE OR MISSING


BINDS IN SLIDE
FAILS TO UNLATCH
SLIDE 1
63
5
TONE ARM LOCATOR 16
LOOSE OR MISSING 64
4
MS39H

17. Power is removed from motor as pickup lands on record.

A. Shut off slide bracket (12), fig. (3), may be bent.
B. Low tension or missing spring (73), fig. (3).

Removing Main Assemblies

Removing Turntable

To remove turntable, lift straight up with a rotary motion.

Removing Separator Arms

To remove separator arm, loosen set screws and lift off.

Removing 12 in. Separator Blade

Remove Separator arm and by the use of a small screw driver remove the small screw up inside the separator sleeve (see fig. (21)). This removes the knob and 12 in. blade. The 10 in. blade is not removable.

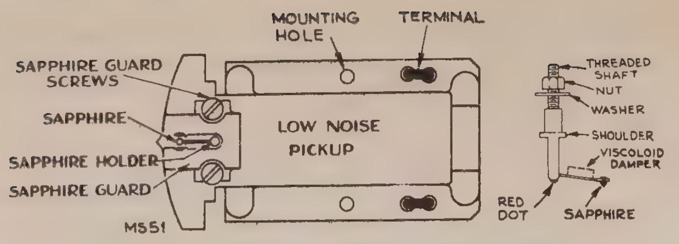
Removing Sub-assembly

To remove the large gear sub-assembly, remove the turntable and remove the two small screws on either side of the turntable spindle. Also remove the large nut holding the gear shaft. The entire gear bracket, etc., can be removed easily.

Removing Tone Arm

To remove the tone arm from the mounting bracket, it is necessary to remove the two screws located under the pivot end of the tone arm. These screws are more accessible if the bracket and shaft are removed by loosening bolt "D" as indicated in fig. (16).

960001 Series



LOW NOISE PICKUP

Note: Stock #39851 has red dot on bottom of sapphire holder, 13.5 mil. dia. sapphire mounting wire, but no viscoloid damper. Stock #70332 has viscoloid damper on sapphire mounting wire.

Replacement of Sapphire

Caution: Never bend the sapphire support wire. Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the mounting until the sapphire holder assembly comes free. Use of a drop or two of acetone will facilitate the removal of the nut and shaft. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through mounting and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little. Apply a drop of light cement (such as Glyptal) to the sapphire nut holder.

Replacement Parts

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
71294	Arm—Pickup arm shell only for 960001-1, -2, -3, -4 and -5
72930	Arm—Pickup arm shell only (for 960001-6)
71311	Bracket—Hinge bracket and shaft assembly (53), fig. (24)
71327	Bracket—Tone arm bracket assembly (52), fig. (24)
72507	Cable—Shielded pickup cable (crystal pickup to terminal board)
71325	Clamp—Fulcrum clamp (54), fig. (24)
39851	Crystal—Pickup crystal cartridge for 960001-1, -3, -4, -5 and -6
70332	Crystal—Pickup crystal cartridge for Model 960001-2
71326	Fulcrum—Tone arm fulcrum (55), fig. (24)
31048	Plug—Pin plug for pickup cable
38449	Sapphire—Sapphire and holder for #70332
39863	Sapphire—Sapphire and holder for #39851
71312	Slide—Counter balance adjusting slide (53a), fig. (24)
71307	Spring—Counter balance spring (56), fig. (24)
	MOTOR ASSEMBLIES
	Stamped L230231
71391	Wheel—Idler wheel for motor L230231
	MOTOR ASSEMBLIES
	Stamped L230270
71960	Motor—Motor 105/125 volt, 60 cycle, complete
71412	Spring—Idler wheel tension spring for motor #L230270
71137	Spring—Spring to convert 60 cycle motor #L230270 to 50 cycle
71411	Wheel—Idler wheel for motor #L230270
	MOTOR ASSEMBLIES
	Stamped L230161
71412	Spring—Idler wheel tension spring for motor #L230161
71411	Wheel—Idler wheel for motor #L230161
	MOTOR ASSEMBLIES
	Stamped L230200
71414	Spring—Idler wheel tension spring for motor #L230200
71413	Wheel—Idler wheel for motor #L230200
	OPERATING MECHANISM
71353	Arm—Detent arm assembly (2), fig. (3)
71375	Arm—Drive arm assembly (22), fig. (3)
71377	Arm—Selector arm #1 and blade (10 in.) assembly (45), fig. (1) (minus knob) (for 960001-1, -2, -3, -4 and -5)
72931	Arm—Selector arm #1 and blade (10 in.) assembly (45), fig. (1) less knob (for 960001-6)
71381	Arm—Selector arm #2 and blade (10 in.) assembly (43), fig. (1) (minus knob) (for 960001-1, -2, -3, -4 and -5)
72932	Arm—Selector arm #2 and blade (10 in.) assembly (43), fig. (1) less knob (for 960001-6)
71357	Blade—Pickup shorting switch blade assembly, fig. (3)
71379	Blade—Selector blade, 12 in. (49), fig. (20)
71344	Bracket—Shutoff bracket (10), fig. (3)
71383	Bracket—Shutoff selector bracket assembly (50), fig. (20)
71337	Bracket—Shutoff slide bracket assembly (12), fig. (3)
71314	Bumper—Retard lever rubber bumper (on lever 26), fig. (4)
71359	Bumper—Tone arm rubber bumper (on motor board)
71317	Bumper—Trip dog rubber bumper (on trip dog 31) fig. (4)
71318	Bumper—Trip lever rubber bumper, fig. (4)
39386	Cable—Shielded pickup cable complete with pin plug for 960001-1, -2, -3 and -4 (terminal board to radio chassis)
72583	Cable—Shielded pickup cable complete with pin plug for Models 610V1, 610V2 and 711V2 (terminal board to radio chassis)
72437	Cable—Shielded pickup cable complete with pin plug for Model 641TV (terminal board to radio chassis)
71373	Cam—Shutoff cam shaft assembly (41), fig. (21) or fig. (3)
71330	Cover—Switch cover
71331	Escutcheon—Control escutcheon
71365	Gear—Pinion gear (37), fig. (5)
71386	Gear—#1 post gear (35), fig. (3)
71388	Gear—Drive gear sub-assembly (32), fig. (4)
71374	Gear—Post gear #2 (36), fig. (22) and fig. (3)
71328	Grommet—Rubber mounting grommet (motor) (3 required)
71321	Grommet—Tone arm mounting grommet (74), fig. (24)
71363	Housing—Spindle housing and bushing assembly (38), fig. (4)
71335	Hub—Tone arm locator hub (die cast hub bolted to motor board beneath tone arm bearing)
71329	Insulator—Switch cover insulator
71334	Knob—Control knob assembly
71378	Knob—Selector arm knob #1 assembly (48), fig. (1)
71382	Knob—Selector arm knob #2 (44), fig. (1) for 960001-1,2-3, -4 and -5
72933	Knob—Selector arm knob #2 (44), fig. (1) (for 960001-6)
71346	Latch—Tone arm latch (center) (13), fig. (12)
71347	Latch—Tone arm latch (inner) (14), fig. (12)
71348	Latch—Tone arm latch (outer) (15), fig. (12)
71350	Lever—Reset lever assembly (18 and 19), fig. (3)
71305	Lever—Drive gear stop lever assembly (34), fig. (4)
71340	Lever—Shutoff lever assembly (7), including shutoff dog (8), fig. (3)
71358	Lever—Tone arm lever assembly (17), including roller and knurled edge (30), fig. (3)
71369	Lever—Trip lever assembly (28), including trip dog (31) and roller, fig. (4)
71370	Lever—Tone arm retard lever (26), fig. (4)
71368	Lever—Clutch engagement lever (33), fig. (5)
71309	Link—Connecting link (6), fig. (2)
71367	Link—Drive link assembly (20), fig. (2)
71336	Locator—Tone arm locator (16), fig. (3)
71332	Lockout—Manual lockout assembly (4 and 5), including slide (1), fig. (3)
71319	Pin—Stop lever pivot pin (mounting pin), fig. (4)
71316	Pin—Tone arm lift pin (51), fig. (24)
71362	Plate—Segment tie plate (24), fig. (3)
71352	Plate—Switch plate assembly
71297	Plate—Thrust plate (39), fig. (2)
71376	Rod—Drive link connecting rod (21), fig. (2)
71315	Roller—Drive link roller on link (20), fig. (2)
71303	Screw—Retard lever screw (mounting screw for lever (26)), fig. (4)
71360	Segment—Segment #1 assembly (23), fig. (3)
71361	Segment—Segment #2 assembly (25), fig. (3)
71366	Shaft—Drive gear shaft, fig. (4)
71371	Shaft—Selector shaft #1 assembly (46), fig. (17)
71380	Shaft—Selector shaft #2 (42), fig. (21)
71313	Shoe—Trip shoe (29), fig. (3)
71372	Sleeve—Selector shaft sleeve (47), fig. (17)
71333	Slide—Manual reject slide (27), fig. (3)
71338	Slide—Shutoff slide (11), fig. (3)
71364	Spindle—Turntable spindle assembly
71355	Spring—Detent arm spring (62), fig. (3)
71308	Spring—Manual lockout spring (inner) (64), fig. (3)
71296	Spring—Manual lockout spring (outer) (63), fig. (3)
71299	Spring—12 in. reset slide spring (66), fig. (3)
71351	Spring—Reset lever spring (65), fig. (3)
71345	Spring—Shutoff bracket spring (72), fig. (3) or fig. (14)
71341	Spring—Shutoff lever spring (70), fig. (3)
71339	Spring—Shutoff slide spring (73), fig. (3)
71343	Spring—Shutoff trip spring (71), fig. (3)
71300	Spring—Stop lever spring (61), fig. (4)
71293	Spring—Tone arm booster spring (67), fig. (3)
71349	Spring—Tone arm latch spring (outer) (69), fig. (3) or fig. (12)
71306	Spring—Tone arm locator and latch spring (68), fig. (3)
71301	Spring—Trip dog spring (60), fig. (4)
71304	Spring—Trip lever spring (59), fig. (4)
71302	Spring—Retard lever spring (58), fig. (4)
71356	Strip—Contact mounting strip assembly (part of pickup shorting switch), fig. (3)
71320	Switch—Power switch, fig. (2)
71342	Trip—Shutoff trip assembly (9), fig. (3)
71385	Turntable—Turntable assembly
71322	Washer—Tone arm special washer (75), fig. (24)
71298	Wafer—Thrust wafer (40), fig. (2)
71292	Washer—"C" washer (large)
71295	Washer—"C" washer (small)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

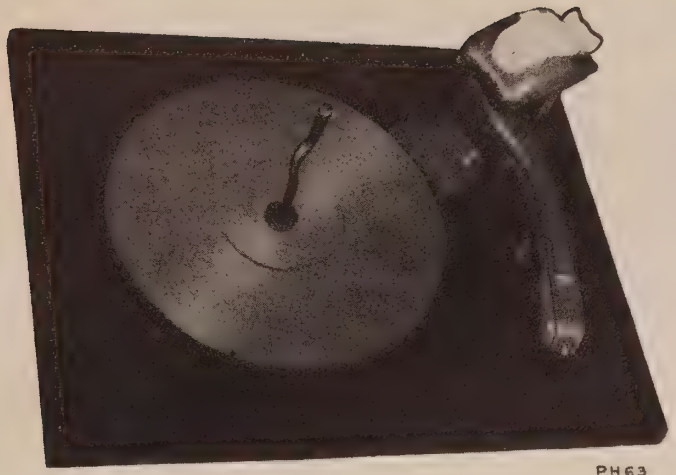
960015 Series

Automatic Record Changer

SERVICE DATA

—1945 No. 11—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



PH63

Features

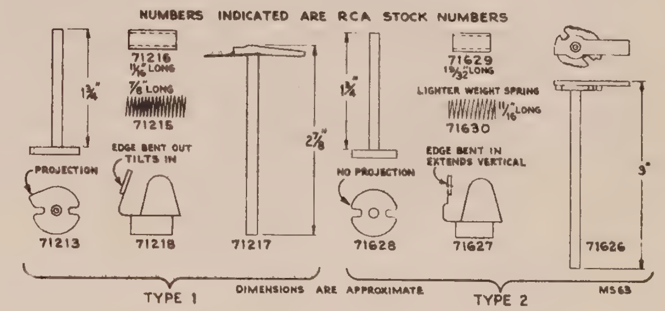
1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "constant diameter" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of turning one record support to change from 10 to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.

Cautions

1. Do not attempt to handle tone arm while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.
6. Do not pack and ship changer without first pushing down on reject button to release catch.
7. When replacing the needle do not tighten set screw excessively as the twisting may crack the crystal.
8. Never turn separator shelf while mechanism is in cycle.

Manual Operation

1. Rotate the record separator shelf to 10 or 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.
   Note: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.



Record Change Model 960015 has been built with a few parts of different construction. These types are marked 960015-1 and 960015-2 on the bottom of the motorboard. The above drawings illustrate the differences between two types, and clearly show that the separate parts, shown above, are not readily interchangeable. However, type (1) can be changed to type (2) by interchanging the parts as a group.

When ordering individual parts, make certain to order the correct parts for your particular type.

In adjusting or timing of either type, refer to the timing adjustment in this bulletin.

NOTE: In remounting tone arm it may be found easier to remove tone arm height adjusting screw and proceed to engage mounting hinge on pivot by sliding hinge in from the rear of the mounting bracket rather than down from the top.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10 or 12-inch records until the record size indicated on the support cover is pointing toward the center post.
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Turn power switch on and press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play the entire stack automatically.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.
   NOTE: **DO NOT OPERATE MECHANISM WITH THE RECORD SEPARATOR SHELF TURNED TO ANY POSITION OTHER THAN THE NORMAL 10-INCH OR 12-INCH OPERATING POSITION.**

When the mechanism is not in use, it should be out of cycle and the tone arm on the rest.

No attempt should be made to turn record separator shelf while mechanism is in cycle.

Preliminary Adjustments in Assembling Mechanism

1. Make certain the mechanism is out of cycle and all the levers, cams, springs, etc., on the underside of the mechanism are in place by comparing it with sketches and photographs.
2. Latch the reject actuating slide (43) by pulling slide in guide until it engages the reject latch (fig. 4).
3. With the tone arm and record separator shelf removed, assemble the parts shown in fig. 3.
4. Rotate tone arm mounting bracket (22) assembly counterclockwise against stop stud (16) (fig. 3).
5. Studs 17 should be in the position indicated in fig. 3, when the trip stud (15) (fig. 4) is pulled toward the record center post as far as it will go.
6. Tighten set screws "E" (fig. 3), allowing very little vertical play in tone arm pivot (but not binding).
7. Place record separator shelf in position, with the tone arm locking cam (26) in the position indicated in fig. 3.
8. Mount separator shelf with mounting screws (75) (fig. 1).
9. Rotate record support shelf to 10 in. position and remove 10 in. landing adjustment stud B, press down on reject button and rotate turntable by hand in the normal direction until a click is heard. Place separator slide actuating lever (33) in position approximately ⅜ in. from bracket as indicated in fig. 2. Tighten set screw "G." (Allow a little space between elevating rod (40) and tone arm locking cam (26) (fig. 1) when the mechanism is in the playing or out of cycle position.) Replace stud B (fig. 2).
10. When the foregoing adjustments have been made, remove record slide assembly by removing screws (75) (fig. 1) and assemble tone arm by snapping mounting hinge over bearing studs.
11. Replace slide assembly by feeding tone arm locking cam (26), down through the hole in tone arm and engaging studs (17). Make certain all levers remain in correct position while engaging cams and studs (17) and replacing mounting screw (75).
12. Mechanism can now be turned by hand to check its action. It should require only minor adjustments for tone arm height, landing and tripping. A description of these adjustments may be found under their respective heading.

Adjustments

A—12" landing.
B—10" landing.
D—Tone arm height adjustment screw.
E—Locking (set screw) for positioning elevating rod in relation to tone arm.
F—Tripping adjustment.
G—Locking (set screw) for positioning record slide separator actuating lever and landing positioning lever.

Landing Adjustment

1. It is necessary to remove record support cover by prying out the four round clips at the lower edge of the cover.
2. Turn the record support to 10 or 12-inch position and place record on turntable.
3. With power removed from mechanism, push down on reject button and allow to cycle while rotating it by hand. Note where the needle lands.
4. Loosen lock nuts and adjust (B) for 10-inch landing and (A) for 12-inch landing. Turning studs counterclockwise moves the landing in, and turning clockwise moves the landing to the outer edge.
5. Turn power on and allow mechanism to cycle by pressing down on reject button. This should be repeated several times and adjusted until the pickup lands consistently at the beginning of the record.
6. Hold adjustment bolts with wrench and tighten lock nut. Test by playing through a stack of records.

Tripping Adjustment

Tripping should occur when the needle is approximately 1⅝ inches from the side of center post. If the mechanism fails to trip at the proper point, turn adjustment screw (F) clockwise to delay, and turn counterclockwise to advance the tripping point. Try a few standard records to determine whether tripping is properly adjusted.

Tone Arm Height Adjustment

1. Remove the power from the mechanism.
2. Place a stack of ten 12-inch or twelve 10-inch records on the turntable. With the mechanism in cycle, rotate the turntable by hand. The tone arm should clear the top record without touching the record on support post above.
3. Adjust screw (D) for this condition.

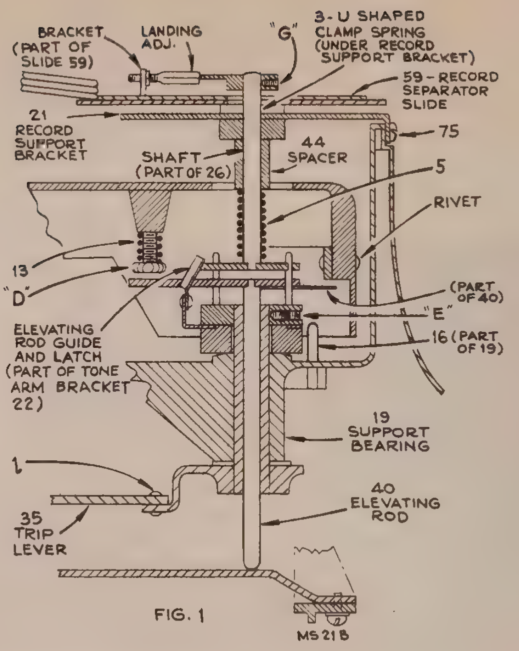

BRACKET (PART OF SLIDE 59)
LANDING ADJ.
"G"
3-U SHAPED CLAMP SPRING (UNDER RECORD SUPPORT BRACKET)
59-RECORD SEPARATOR SLIDE
21 RECORD SUPPORT BRACKET
75
SHAFT (PART OF 26)
44 SPACER
5
RIVET
13
"D"
(PART OF 40)
"E"
ELEVATING ROD GUIDE AND LATCH (PART OF TONE ARM BRACKET 22)
16 (PART OF 19)
19 SUPPORT BEARING
1
40 ELEVATING ROD
35 TRIP LEVER
MS 21 B

FIG. 1

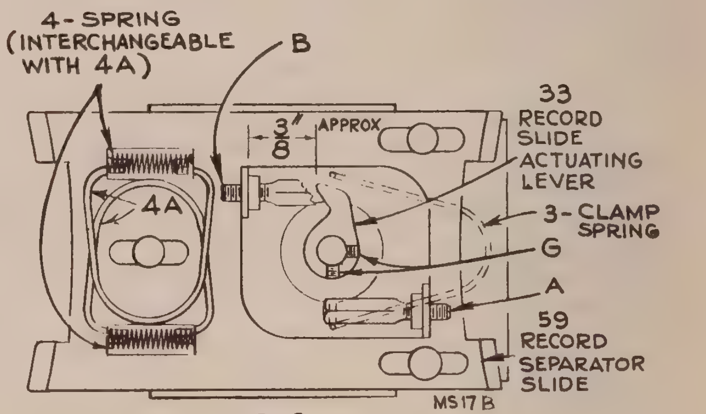

4-SPRING (INTERCHANGEABLE WITH 4A)
B
3/8" APPROX
33 RECORD SLIDE ACTUATING LEVER
4A
3-CLAMP SPRING
G
A
59 RECORD SEPARATOR SLIDE
MS17 B

FIG. 2

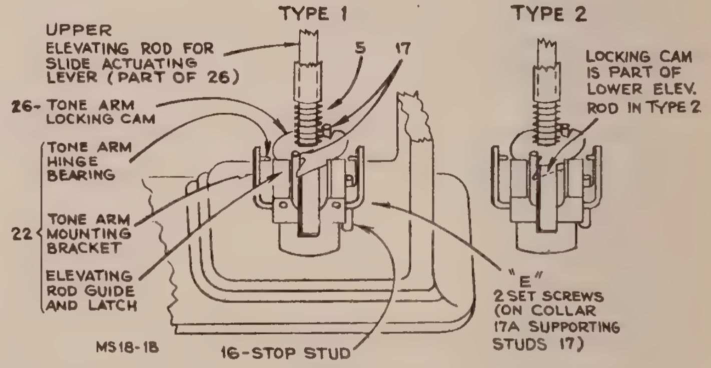

TYPE 1
TYPE 2
UPPER ELEVATING ROD FOR SLIDE ACTUATING LEVER (PART OF 26)
5
17
26-TONE ARM LOCKING CAM
TONE ARM HINGE BEARING
22
TONE ARM MOUNTING BRACKET
ELEVATING ROD GUIDE AND LATCH
LOCKING CAM IS PART OF LOWER ELEV. ROD IN TYPE 2
"E" 2 SET SCREWS (ON COLLAR 17A SUPPORTING STUDS 17)
MS18-1B
16-STOP STUD

FIG-3

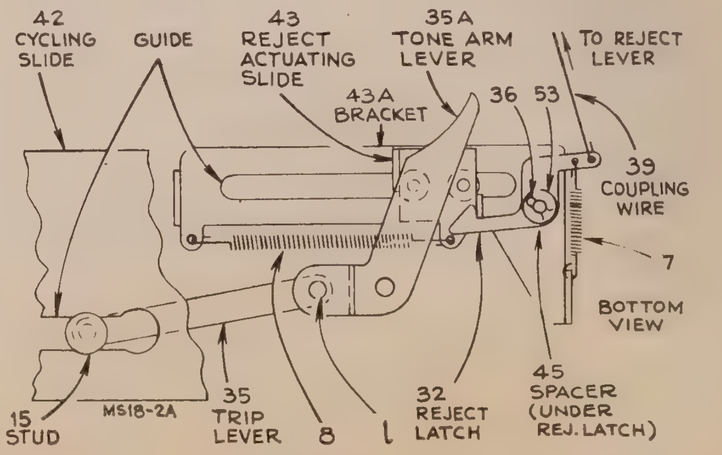

42 CYCLING SLIDE
GUIDE
43 REJECT ACTUATING SLIDE
43A BRACKET
35A TONE ARM LEVER
TO REJECT LEVER
36
53
39 COUPLING WIRE
7
BOTTOM VIEW
45 SPACER (UNDER REJ. LATCH)
32 REJECT LATCH
1
8
35 TRIP LEVER
MS18-2A
15 STUD

FIG. 4

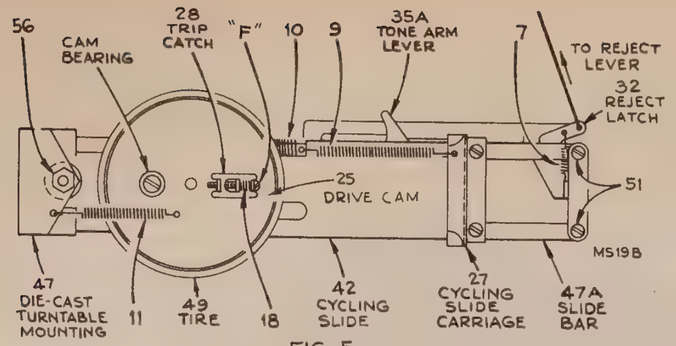

56
CAM BEARING
28 TRIP CATCH
"F"
10
9
35A TONE ARM LEVER
7
TO REJECT LEVER
32 REJECT LATCH
25 DRIVE CAM
51
MS19B
47 DIE-CAST TURNTABLE MOUNTING
11
49 TIRE
18
42 CYCLING SLIDE
27 CYCLING SLIDE CARRIAGE
47A SLIDE BAR

FIG-5

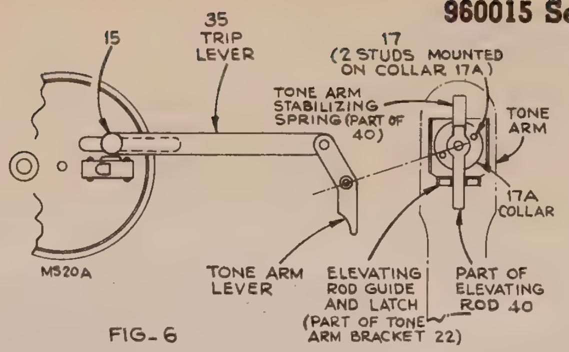

15
35 TRIP LEVER
17 (2 STUDS MOUNTED ON COLLAR 17A)
TONE ARM STABILIZING SPRING (PART OF 40)
TONE ARM
17A COLLAR
MS20A
TONE ARM LEVER
ELEVATING ROD GUIDE AND LATCH (PART OF TONE ARM BRACKET 22)
PART OF ELEVATING ROD 40

FIG-6

Cycle of Operation

FUNCTION	EXPLANATION
Power Switch.	1. Energizes drive motor, causing turntable to rotate.
Reject Button.	1. Tone arm is resting on reject button, therefore pushing down on arm actuates reject button. 2. Reject button pushes down on reject lever (34) Fig. (9). 3. Reject lever transfers action to reject latch (32) Fig. (4) through coupling wire (39). 4. Reject actuating slide (43) being unlatched, is pulled against tone arm lever (35A) by spring (8).
Trip lever moves away from center post.	1. Energy is transferred from tone arm lever (35A) to trip lever (35) through hinge bearing. 2. Stud (15) slides in guide cut in cycling slide (42). 3. Stud (15) slides past trip catch (28) Fig. (5).
Drive cam rotates.	1. Trip catch (28) being free, spring (11) pulls the eccentric drive cam (25) around causing the rubber tire rim to contact the knurled drive roller (41) Fig. (7). 2. The bearing of drive cam (25) Fig. (5) is mounted on cycling slide (42), therefore rotation of the eccentric cam causes the slide to move on the slide bars (47A), against the tension of spring (10) and away from center post (37) Fig. (7).
Cycling Slide moves away from Center Post. Tone arm raises.	1. Cycling slide (42) Fig. (5) being curved at the tone arm bearing end, starts to push up on tone arm elevating rod (40) Fig. (1). 2. Elevating rod (40) in raising, pushes against adjustment screw (D) causing the tone arm to raise on hinge bearing. 3. Tone arm elevating rod in raising, pushes against tone arm locking cam and rod, thus raising the record slide actuating lever mounted on end of rod. 4. Slide (42) Fig. (5) moving further, causes takeup safety slide (42A) Fig. (9) to push against tone arm lever (35A) Fig. (4) thereby moving tone arm out and transferring energy through tone arm locking cam shaft to slide actuating lever (33) Fig. (2). 5. Tone arm locking cam (26) Fig. (3), latches on inner edge of tone arm elevating rod guide. This couples the tone arm to record slide actuating lever through tone arm locking cam shaft. 6. Record slide actuating lever (33) Fig. (2) pushes against stud (A or B) causing record slide to push record forward off the center post. 7. Record drops and springs (4) cause slide to return to normal position. 8. Stud (A or B) on record slide returning, pushes against slide actuating lever (33), transferring the motion to tone arm which moves the tone arm in for landing. 9. When cycling slide (42) Fig. (5) is moving away from center post towards its limits, takeup slide (42A) Fig. (9) resets the reject actuating slide (43) (Fig. (4).
Slide returns and pickup lands.	1. Tension of springs (10) and (11) Fig. (5) keeps cam (25) in contact with rotating knurled roller (41) Fig. (7), thereby causing cycling slide (42) Fig. (5) to return towards its normal position. 2. Drive cam moving towards minimum diameter is pulled off center and away from knurled roller (41) Fig. (7) by spring (11) Fig (5). Stud (15) Fig. (4) engages trip catch (28) Fig. (5) and holds cam from engaging knurled roller. 3. During operation (2) above, the tone arm elevating rod (40) Fig. (1) lowers, unlatching tone arm locking cam (26) Fig. (3) and allowing the pickup to land on the record.
Playing cycle.	1. Trip catch (28) Fig. (5) is held against stud (15) Fig. (4), until pickup moves in close enough to center post for stud (15) to clear the trip catch, thereby starting a new cycle.

Removing Tone Arm

First it is necessary to remove the record support shelf by removing the two mounting screws (75). Then tilt and raise slowly.

The entire record slide actuating lever, bearing rod, and spring will come off with the record support assembly. The tone arm may then be removed by disengaging the hinge bearing. This may be done by prying with a screw driver through the opening in the top of the arm.

Removing Turntable

Remove the center post by removing nut (56) (fig. 7) and tapping end of center post. The turntable can then be removed by loosening set screw (c) on knurled roller and pulling upward with a rotary motion.

Removing Pickup Cartridge

Remove the two screws holding the cartridge and unsolder shielded leads.

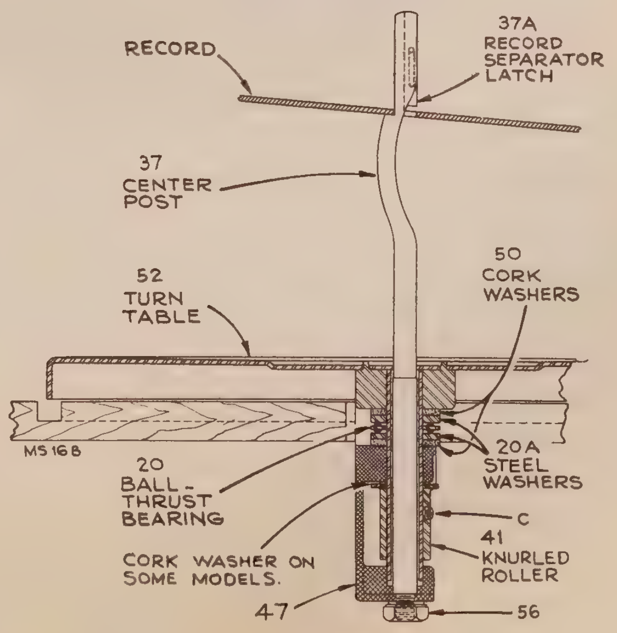

RECORD
37A RECORD SEPARATOR LATCH
37 CENTER POST
50 CORK WASHERS
52 TURN TABLE
MS16B
20A STEEL WASHERS
20 BALL-THRUST BEARING
C
41 KNURLED ROLLER
CORK WASHER ON SOME MODELS.
47
56

FIG-7

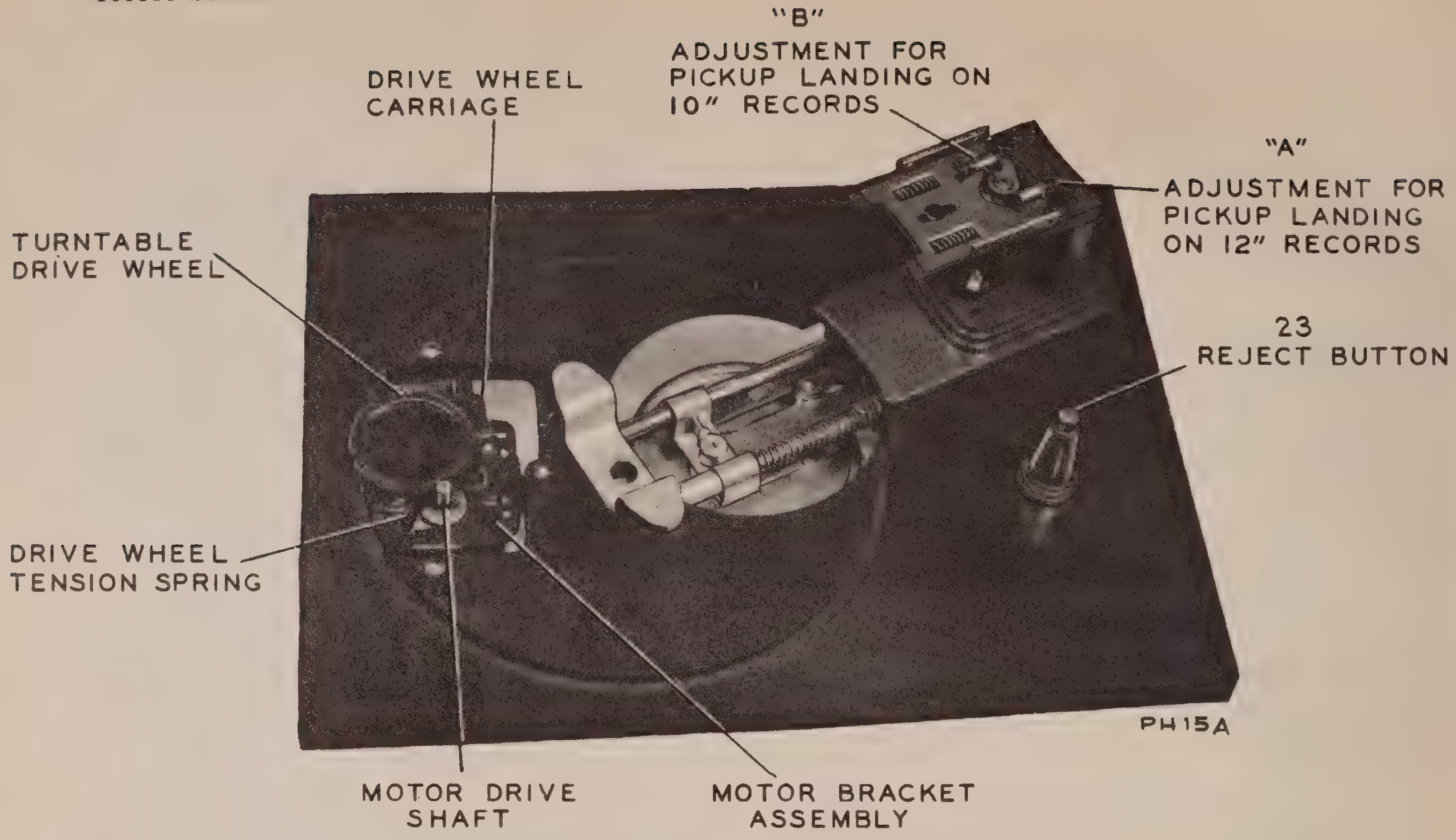

"B"
ADJUSTMENT FOR PICKUP LANDING ON 10" RECORDS
DRIVE WHEEL CARRIAGE
"A"
ADJUSTMENT FOR PICKUP LANDING ON 12" RECORDS
TURNTABLE DRIVE WHEEL
23
REJECT BUTTON
DRIVE WHEEL TENSION SPRING
PH15A
MOTOR DRIVE SHAFT
MOTOR BRACKET ASSEMBLY

FIG. 8

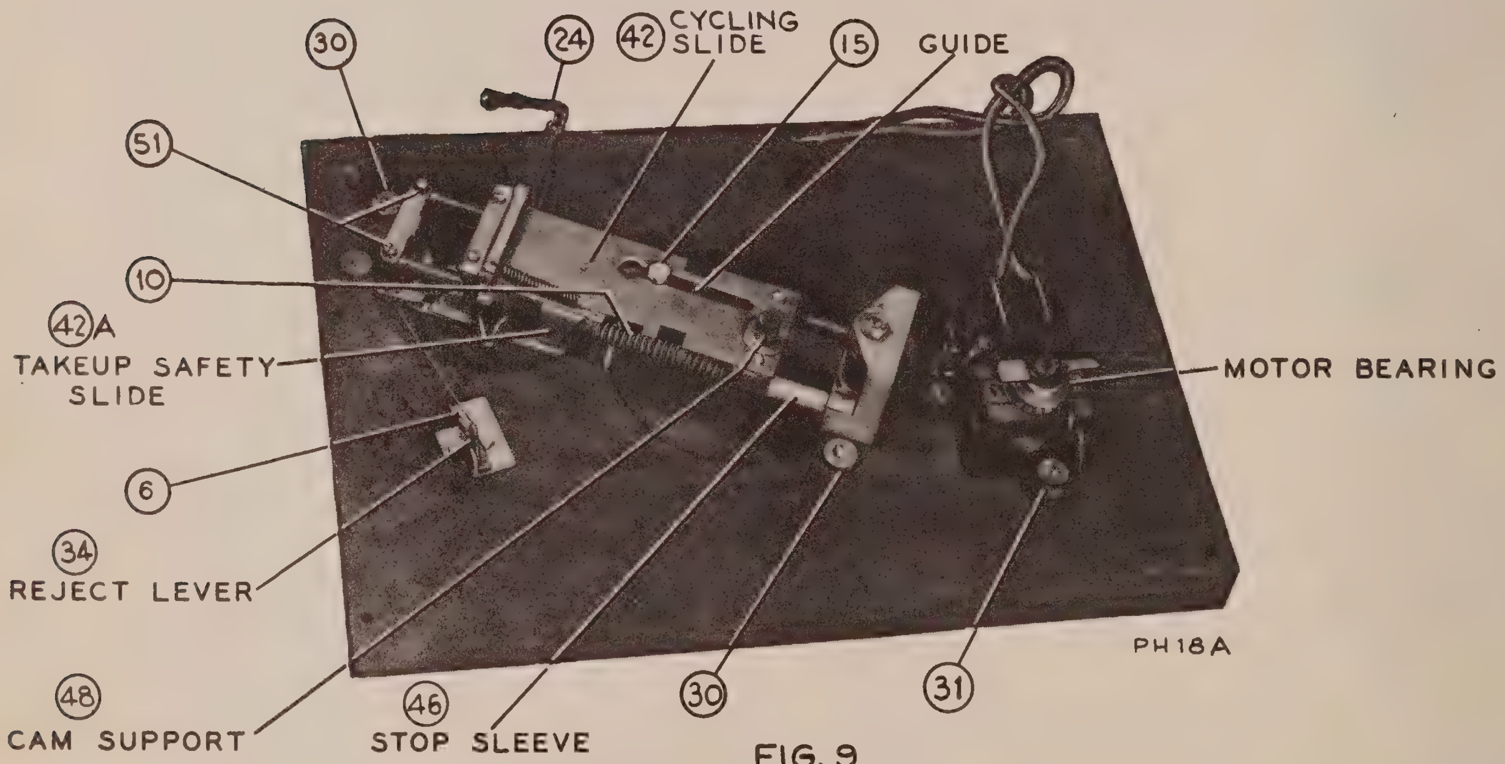

30
24
42 CYCLING SLIDE
15
GUIDE
51
10
42A
TAKEUP SAFETY SLIDE
MOTOR BEARING
6
34
REJECT LEVER
PH18A
48
CAM SUPPORT
46
STOP SLEEVE
30
31

FIG. 9

Functions of Principal Levers

Trip Lever (35) (fig. 4)
When the pickup has moved beyond the end of the recorded section of the record, the trip lever pulls stud (15) past trip catch to start automatic cycle.

Cycling Drive Cam (25) (fig. 5)
Transfers motion from turntable for cycling action.

Cycling Slide Assembly (fig. 5)
Provides mounting for cycling cam bearing and transfers energy to tone arm elevating rod and separator slide.

Tone Arm Lever (35A) (fig. 4)
Directs the horizontal movement of tone arm.

Tone Arm Locking Cam (26) (fig. 3)
Locks tone arm to record slide actuating lever to provide landing movement and positioning.

Tone Arm Elevating Rod (40) (fig. 1)
Transfers motion from cycling slide to elevate tone arm while cycling.

Actuating Lever Shaft (Part of 26) (fig. 1)
Transfers motion to and from separator slide.

Record Separator Slide (59) (fig. 2)
Pushes records off support notch on center post.

Center Post (37) (fig. 7)
Main record support incorporating the separator latch.

Separator Latch (Part of 37) (fig. 7)
Small slide set in a vertical keyway in the top end of the center post, provides means for separating the records.

Service Hints

(1) **Rumble**

(A) Remove motor assembly (mounting bolts, fig. 9) and inspect rubber tire idler for rough spots.

(B) Make certain rubber shock supports on drive motor and mechanism are not drawn up too tight.

(C) Make certain cork washers (50) (fig. 7) are in place on turntable bearing.

(D) Check for microphonic tube in amplifier.

(2) **"Wow" or Speed Variation**

(A) With mechanism out of cycle remove motor assembly (bolts, fig. 9) and examine rubber drive idler and rim of turntable for grease or oil.
(Oil or grease can be removed with carbontetrachloride or naphtha.)

(B) Check for bent motor shaft.

(C) Check for bent motor mounting plate.

(D) Check for irregularity in rubber tire idler.

(E) With the drive motor removed, the turntable should rotate freely when turned by hand. Bind in turntable may be caused by:

1. Burrs in bearing support casting.
2. Bent center post.
3. Improperly seated center post.
4. Gummed grease in thrust bearing.
5. Under side of turntable rubbing due to insufficient clearance. (It may be necessary to add an additional washer on turntable bearing to elevate it sufficiently to clear mounting bracket, etc.)
6. Cycling knurled drive roller (41) fig. (7) set too low on turntable shaft thereby acting as a thrust bearing and making the ball thrust bearing ineffective. Loosen adjustment screw "C" and allow turntable to seat on thrust bearing making certain steel and cork washers aren't missing. In positioning the knurled roller about 1/32 inch vertical play should be allowed.
7. Friction between a stack of records and center post may cause squeaking. It may also place an additional load on drive motor, causing "wow." An application of wax on the center post should remedy this condition.

(3) **Continuous Tripping** may be caused by:

(A) Trip stud "15" fig. (4) not engaging trip catch (28) fig. (5).

(B) Reject button sticking.

(C) Reject latch lever spring (7) fig. (4) being loose or missing.

(D) Worn reject latch lever.

(E) Bent reject actuating slide (43) fig. (4) at point of contact to latch. (Will not remain latched.)

(F) Missing or broken safety spring (9) fig. (5).

(4) **"Feedback or Howl"**

This trouble is caused by energy from the speaker getting back into the input of the amplifier.
Check for:

(A) Microphonic tube.

(B) Gain control advanced too far.

(C) Mounting rubber "shocks" bolted down too tight.

(5) **Failure to Trip** may be caused by:

(A) Pickup not following grooves due to:

1. Bind in tone arm bearing. (Will also cause erratic landing.)
2. Improper adjustment of trip catch (F) fig. (5).
3. Binding in hinge bearing. (May also cause repeating of grooves.)
4. Bind in trip stud guide. (May also cause repeating of grooves.)
5. Tone arm height adjustment (D) fig. (1) set too high. (May cause tone arm to hit the records on support post.)

(6) **Improper Landing of Pickup**

(A) Landing adjustments (A or B) improperly set. (See landing adjustments.)

(B) Spring (9) fig. (5) loose or missing.

(C) Springs (4) fig. (2) out of position. (Separator slide will also fail to return.)

(D) Loose adjustment bolts (E or G) (figs. 2 and 3). (Records will also fail to drop.)

(E) Broken or bent elevating rod guide. (Tone arm locking cam (26) fig. (3) should remain locked to elevating rod guide until the very instant before pickup lands.) (Bend guide if necessary.)

(F) Bind in tone arm support bearing.

(G) Tone arm locking cam may not engage catch.

(H) Tone arm locking cam may not disengage catch. (Bend elevating rod guide.)

(I) Tone arm mounting rivets loose.

(7) **12-inch Landing Differs With Cover Assembly On From That With That With Cover Assembly Off**
The 12-inch landing adjustment screw "A" may be touching the cover assembly (54) during the change cycle. Correct by filing down the end of the screw until it clears.

(8) **Pickup Arm Landing Differs For Manual Rejection and Automatic Cycle**

(A) (Type 1 parts only).
Latch spring (part of 22) requires adjustment. Raise the pickup arm and bend the left leg of the flat "U" shaped latch spring back as far as possible with a screwdriver so that the lip of the tone arm locking cam (part of 26) will engage the latch spring.

(B) Loose or improperly set record slide actuating lever (33). (See "Preliminary Adjustments" 9, page 2.)

(C) Loose or improperly set collar (17A). (See Preliminary Adjustments" and Fig. 3, page 2.)

(D) Check take up safety slide (42A) to assure that it is perpendicular to the cycling slide (ref. 42). The motion transmitted to the tone arm lever assembly (ref. 35A) will cause this arm to move more than the required distance if bent in or less than the required distance if bent out. The latter will cause improper latching of tone arm locking cam (ref. 26) resulting in needle landing at a different position when tripping automatically as compared with tripping with push button.

(9)' **Pickup Landing Is Erratic on Both 10-inch and 12-inch Records**

(A) Record separator return springs (4 or 4A) may not provide sufficient tension. There should be no "slop" in slide assembly between cycles. (See Fig. 2.)

(B) Loose record slide actuating lever (33). (See Preliminary Adjustments" 9, page 2.)

(C) Loose collar (17) or guide studs (17A). Reposition according to "Preliminary Adjustments" 9, page 2.

(D) Loose screws (75) which hold the slide assembly to the rear support casting.

(10) **Repeating Grooves on Record**

(A) Height adjustment (D) fig. (1) set too high.

(B) Bind in tone arm support bearing.

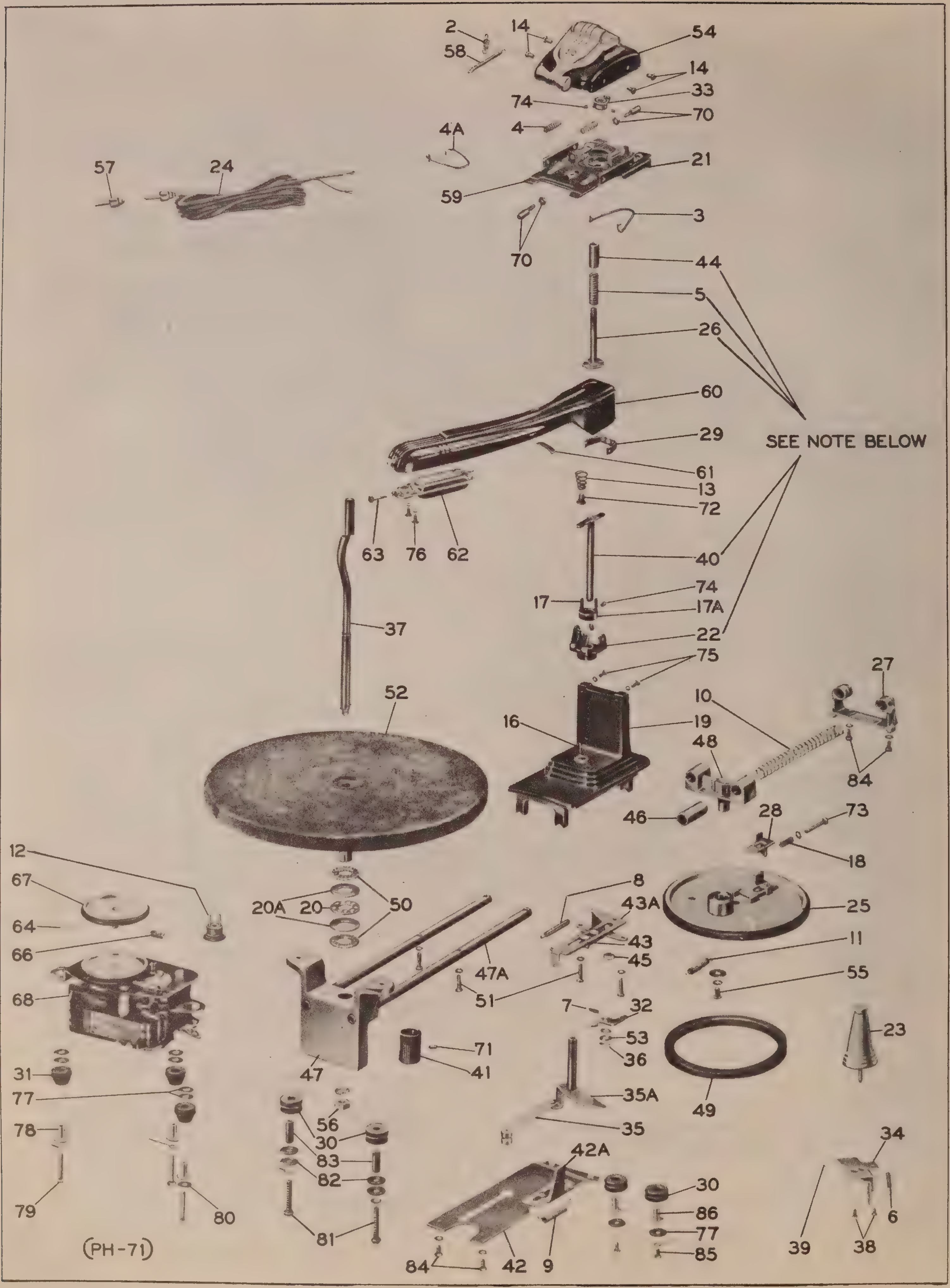
(C) Bind of trip stud (15) fig. (4) in guide.

(D) Bind in tone arm hinge bearing (1).

(E) Tone arm locking cam setting on elevating rod while in the playing cycle.

(Service Hints continued on page 8)

960015 Series


2
14
54
58
14
33
74
70
4A
4
57
24
21
59
3
70
44
5
26
60
29
SEE NOTE BELOW
61
13
72
63
76
62
40
74
17
17A
37
22
75
52
27
10
16
19
48
84
46
28
73
18
12
67
8
43A
20A
20
50
25
64
66
43
45
11
55
68
47A
51
7
32
53
36
23
71
31
47
41
77
35A
49
56
78
30
35
34
83
42A
30
82
86
6
79
80
77
38
39
81
85
84
42
9
(PH-71)

NOTE:—

Parts 44-5-26-40 and 22 are shown for Model 960015-1.

Corresponding parts for Model 960015-2 are shown on page 1 and also listed in Parts List.

Replacement Parts

REF. No.	STOCK No.	DESCRIPTION
1		....
2	71232	Spring—Record stabilizing clip tension spring (10 turns—½″ long x 3/16″ O.D.) (mounted under cover)
3	71211	Clamp—Clamp spring to hold record separator support bracket (21) to record separator (59)
4	71209	Spring—Record separator return spring (2 req'd) (10 turns ¾″ long x .244″ O.D.). Note:— (4) and (4A) interchangeable
5	71215	Spring—Lowering spring for record slide actuating lever (10 turns—11/16″ long x ¼″ O.D.). Type (1) only
	71630	Spring—Lowering spring for record slide actuating lever. Type (2) only
6	71228	Spring—Reject lever spring (25 turns—⅞″ long x 5/32″ O.D.)
7	71223	Spring—Reject latch spring (20 turns—11/16″ long x ⅛″ O.D.)
8	71221	Spring—Spring for reject slide and bracket (31 turns—⅝″ long x 3/16″ O.D.)
9	71204	Spring—Safety spring (30 turns—1-7/32″ long x 1-7/32″ I.D.)
10	71191	Spring—Guide rail recoil spring (23 turns—4½″ long x 13/32″ I.D.)
11	71205	Spring—Drive cam actuating spring (55 turns—1½″ long x 7/32″ O.D.)
12	30870	Plug—2-prong male plug for motor power cable
13	71171	Spring—Lock spring for height adjusting screw (13)
14	71234	Fastener—Push fastener for record shelf cover (4 required)
15		Stud—Part of 35 and 35A } Not stocked separately
16		Stud—Part of 19
17	71219	Collar—Collar and guide studs (17) and (17A)
18	71196	Spring—Tripping adjustment bolt lock spring mounted on main cam (25) (7 turns—23/32″ long x .203″ O.D.)
19	71203	Base—Operating mechanism mounting base and tone arm support bearing
20	71238	Bearing—Turntable thrust bearing (including steel washers (20A))
21	71210	Bracket—Record separator support bracket, only, minus slide (59)
22	71218	Bracket—Tone arm mounting bracket (including elevating rod guide and latch. Type (1) only
	71627	Bracket—Tone arm mounting bracket (including elevating guide and latch). Type (2) only
23	71230	Button—Reject button and tone arm rest
24	71240	Cable—Shielded output cable complete with plug (57)
25	71194	Cam—Main drive cam complete with rubber tire (49)
26	71213	Cam—Tone arm locking cam, including shaft or rod. Type (1) only
	71628	Rod—Rod and cam. Type (2) only
27	71206	Carriage—Cycling slide carriage
28	71195	Catch—Trip catch mounted on main cam (25)
29		Spring—Pivot spring (riveted to tone arm) (not stocked separately)
30	71245	Grommet—Rubber grommet to mount changer (4 req'd) (each grommet is in two sections)
31	71244	Grommet—Rubber grommet to mount motor (3 req'd)
32	71222	Latch—Reject latch
33	71214	Lever—Record slide actuating lever—pushes adjusting screws mounted on record separator to drop records
34	71227	Lever—Reject lever (including mounting bracket)
35	71202	Lever—Trip lever and tone arm lever assembly (including (35A))
36	71226	Pin—Cotter pin to mount reject latch
37	71235	Post—Centre post, including separator latch (37A)
38	†	Screw—#6 x ⅞ drive screw; used for reject lever mounting
39	71229	Wire—Coupling wire, for reject lever (34)
40	71217	Rod—Tone arm elevating rod, including tone arm stabilizing spring. Type (1) only
	71626	Elevating rod and locking cam. Type (2) only
41	71199	Roller—Main cam drive roller (knurled)
42	71207	Side—Cycling slide, including take up safety slide (42A)
43	71220	Slide—Reject actuating slide and bracket (43A), less reject latch and spring (32) and (7)
44	71216	Spacer—Lowering spring spacer. Type (1) only
	71629	Spacer—Lowering spring spacer. Type (2) only
45	71224	Spacer—Reject latch mounting spacer
46	71190	Stop—Stop sleeve for guide rail
47	71188	Support—Turntable mounting support (including guide rails) (47A)
48	71193	Support—Main cam support (including slide carriage)
49	71198	Tire—Main cam rubber tire
50	71239	Washer—Cork washers (1 set of two washers for turntable)
51	71192	Screw—#6-32 x ½″ fillister head screw to mount guide rails (4 req'd)
52	71237	Turntable—Finished turntable plate
53	71225	Washer—Reject latch spring washer
54	71231	Cover—Shell cover and record stabilizing clip (including (2) and (58))
55	†	Screw—R. H. M. S. #8-32 x ¼″ main cam mounting screw
56	71236	Nut—Center post mounting nut
57	31048	Plug—Plug for output cable
58	71233	Bar—Record stabilizing clip, support bar
59	71208	Separator—Record separator slide
		PICKUP AND ARM ASSEMBLIES
60	71172	Arm—Tone arm complete with pivot spring mounting less crystal, shielded lead, height adjusting screw and spring
61	71169	Clamp—Spring clamp to hold pickup leads in arm
62	71173	Crystal—Pickup crystal cartridge
63	71174	Screw—Needle screw
		MOTOR ASSEMBLIES Stamped 407B1
		Note:—When replacing complete motor, order Stock No. 71183
64	71177	Pin—Cotter pin (hair pin spring) for drive idler wheel for motor stamped 407B1
65	71178	Shim—Drive idler wheel thrust shim for motor stamped 407B1
66	71176	Spring—Drive idler wheel tension spring for motor stamped 407B1 (1)
67	71175	Wheel—Drive idler wheel for motor stamped 407B1
		MOTOR ASSEMBLIES Stamped 407B2
		Note:—When replacing complete motor, order Stock No. 71183
64	71181	Pin—Cotter pin (hair pin spring) for drive idler wheel for motor stamped 407B2
65	71182	Shim—Drive idler wheel thrust shim for motor stamped 407B2
66	71180	Spring—Drive idler wheel tension spring for motor stamped 407B2
67	71179	Wheel—Drive idler wheel for motor stamped 407B2
		MOTOR ASSEMBLIES Stamped 407B3
64	71226	Pin—Cotter pin (hairpin spring) for drive idler wheel for motor 407B3
65	71187	Shim—Drive idler wheel thrust shim for motor 407B3
66	71185	Spring—Drive idler wheel tension spring for motor stamped 407B3 (25 turns—1½″ long x 5/32″ O.D.)
67	71184	Wheel—Drive idler wheel for motor stamped 407B3
68	71183	Motor—Motor complete with drive idler, tension spring and mounting bracket less power plug (117 volts, 60 cycles)
69	71186	Bushing—Motor shaft drive pulley for motor stamped 407B3 only
70	71212	Screw—Adjusting screw and locknuts for tone arm landing (2 req'd) (A, B) fig. (2)
71	71200	Screw—#8-32 x ⅛″ bristo head set screw for main cam drive roller knurled (C) fig. (7)
72	71170	Screw—Height adjusting screw (designated) (D) fig. (1)
73	71197	Screw—Trip adjusting screw—mounted on main cam—#6-32 x 1⅛″ round head machine screw (F) fig. (5)
74	71201	Screw—#6-32 x 3/16″ bristo head screw for mounting guide pin and collar assembly (designated "E" fig. (3)) (2 req'd) or mounting the separator adjusting screws actuating rotor (2 req'd) designated (G) fig. (2)
75	†	Screws—B. H. M. S. #6-32 x 5/16″ mounting separator slide
76	†	Screws—Fil. H. M. S #4-40 x ¼″ for mounting crystal cartridge
77	†	Washer—Flat washer (motor mounting)
78	†	Spacer—(motor mounting)
79	†	Screw—R. H. M. S. #6-32 x 1⅛″ motor mounting)
80	†	Washer—Flat washer (motor mounting)
81	†	Screw—R. H. M. S. #8-32 x 1″ (mounting screws for part 47)
82	†	Washer—Flat washer (used in mounting part 47)
83	†	Spacer—Mounting spacer (used in mounting part 47)
84	†	Screw—Fil. H. M. S. #6-32 x ¼″ (mounting cycling plate)
85	†	Screw—R. H. M. S. #6-32 x 11/16″ (mounting bolts for part 19)
86	†	Spacer—(Mounting spacer for part 19)

† Not stocked.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Service Hints

(Continued from page 5)

(11) **Premature Tripping**

- (A) Adjustment (F) fig. (5) improperly set. (See trip adjustment.)
- (B) Loose trip stud (15) fig. (4).

(12) **Changer will not complete cycle**

- (A) Worn rubber tire on drive cam.
- (B) Loose knurled drive roller (41) fig. (7).
- (C) Defective drive motor.
- (D) Bent or improperly assembled parts.

(13) **Changer starts cycling when support post is rotated for size. May be caused by:**

Slide actuating lever contacting landing adjustment bolts. (Bend landing adjustment bolt bracket to allow clearance for lever when not in cycle.)

(14) **Two or More Records Drop at One Time**

- (A) The record separator latch (37A, Fig. 7) may be sticking in its slot. It should be clean and free to move. The bottom edge of the latch should never be rounded. There should be only 1/32 to 1/16 inch clearance between the bottom edge of the latch and the top of one record on the record supports.
- (B) The shelf on the turntable center post (37) may have been damaged by an inexperienced serviceman. It should be flat and smooth. The outer edge should be only very slightly rounded.
- (C) Use of records with enlarged center holes.
- (D) The screws (75) holding the record support shelf (59) to the main rear casting may be loose. The screws (51) holding the guide rails (47A) to the main rear casting may be loose. The center post (37) may be bent or loose. Any one or a combination of these may allow too much clearance between the center post and the record support shelf. Check to see that the above-mentioned screws and center post are not loose, then check spacing between center post and record support shelf by placing a new record of standard size on the supports; with the record seated firmly in the notch of the center post (do not use pressure) the record should clear the record separator slide (59) by 1/32 inch when the mechanism is out of cycle.

(15) **Record Damage**

The spindle shelf and the top of spindle shaft should be free from burrs or rough edges to avoid scratching records or damaging record center holes. The record shelf edge should be smooth and be rounded only to a minute radius. Never round the bottom edge of the record separator latch.

A slight application of wax on the spindle shaft will prevent "squeal" of a stack of records.

(16) **Lubrication**

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

Turntable Bearing

- (A) Casting (type without sleeve bearing insert) use STA-PUT #512 (E. F. Houghton & Co., 303 W. Lehigh Ave., Phila., Pa.).
- (B) Casting (type with sleeve bearing insert) use STA-PUT #512 or SAE #30 motor oil.

Slides and Levers

Use STA-PUT #512 on all parts of frictional contact.

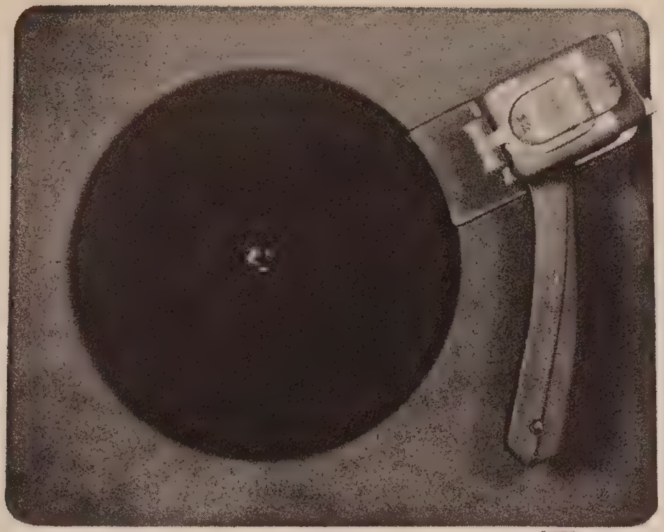
NOTE: Do not lubricate tone arm bearing or elevating rod (40).

Special Tools Required for Servicing Mechanism

1. #6 Bristo set screw wrench (4 spline), Stock No. 71761.
2. #8 Bristo set screw wrench (6 spline), Stock No. 71762.
3. 3/16 inch open end wrench. } Two separate wrenches required.
4. 1/4 inch open end wrench.

Stalling in Cycle on Low Line Voltage:

The roller (Ref. #41) has been re-designed to prevent stalling in cycle at low line voltages. The new type roller is smaller in diameter than the original. The new type roller is Stock No. 72926 and may be used as replacement for Stock No. 71199.


PH80

RCA VICTOR

Models
960260-1, -2, -3, -4
Automatic Record Changer

SERVICE DATA

— 1946 No. 5 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

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NOTE: The major differences between models is the addition of an "Off-On" switch on the motorboard on Model 960260-1 and 3; 960260-4 is for 50 cycle operation.

Features

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "constant diameter" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of turning one record support to change from 10- to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.

Manual Operation

1. Rotate the record separator shelf clockwise for 10-inch or counterclockwise for 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.

   Note: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10- or 12-inch records until the record size indicated on the support cover is pointing toward the center post. (Rotate clockwise for 10-inch and counterclockwise for 12-inch records.)
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Turn power switch on and press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play one side of the entire stack automatically.

   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.

Cautions

1. Avoid handling the tone arm or rotating record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

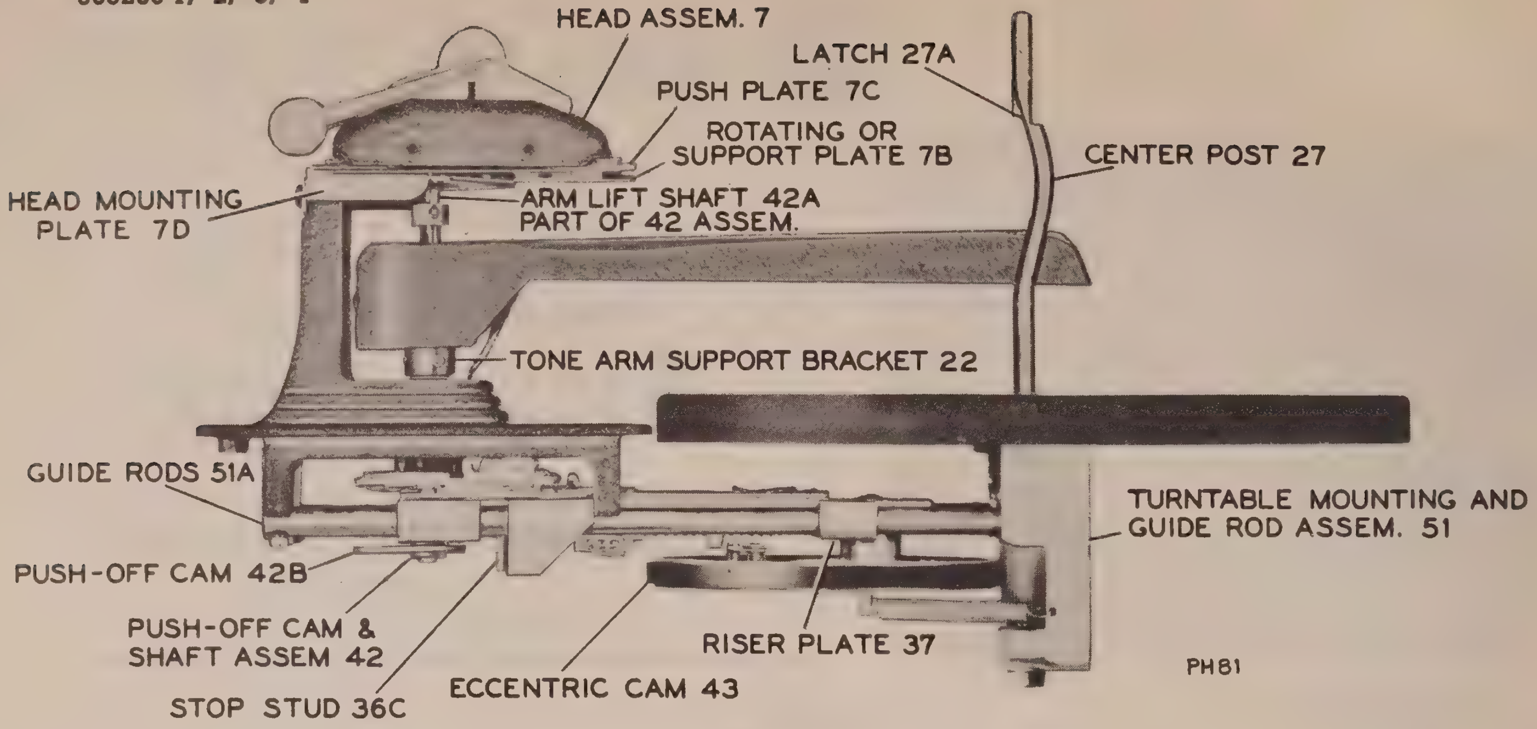

HEAD ASSEM. 7
LATCH 27A
PUSH PLATE 7C
ROTATING OR SUPPORT PLATE 7B
CENTER POST 27
HEAD MOUNTING PLATE 7D
ARM LIFT SHAFT 42A PART OF 42 ASSEM.
TONE ARM SUPPORT BRACKET 22
GUIDE RODS 51A
TURNTABLE MOUNTING AND GUIDE ROD ASSEM. 51
PUSH-OFF CAM 42B
PUSH-OFF CAM & SHAFT ASSEM 42
RISER PLATE 37
PH81
STOP STUD 36C
ECCENTRIC CAM 43

FIG. 1

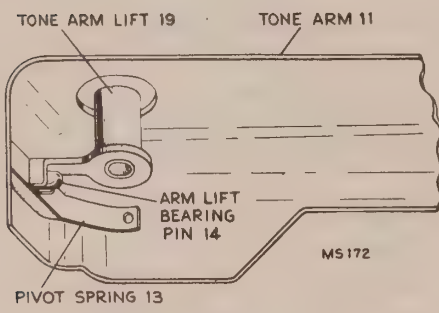

TONE ARM LIFT 19
TONE ARM 11
ARM LIFT BEARING PIN 14
MS172
PIVOT SPRING 13

FIG. 3

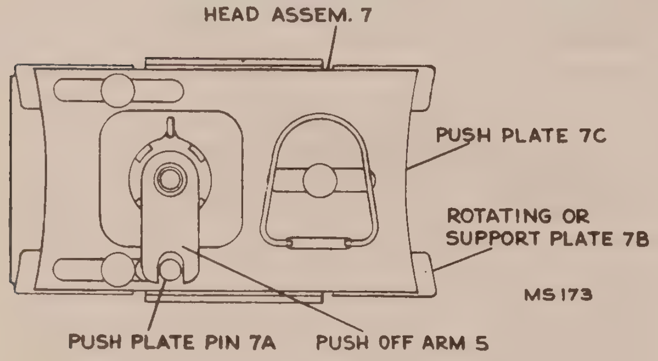

HEAD ASSEM. 7
PUSH PLATE 7C
ROTATING OR SUPPORT PLATE 7B
MS173
PUSH PLATE PIN 7A
PUSH OFF ARM 5

FIG. 4

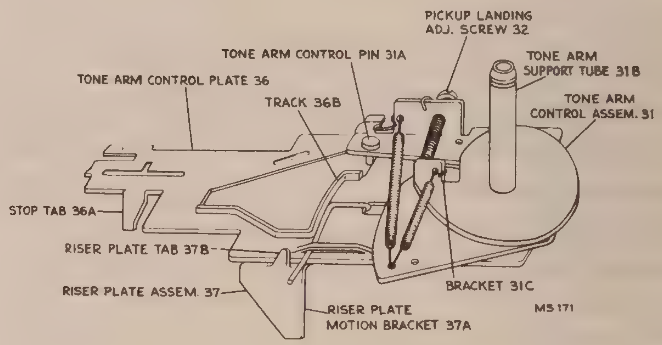

PICKUP LANDING ADJ. SCREW 32
TONE ARM CONTROL PIN 31A
TONE ARM SUPPORT TUBE 31B
TONE ARM CONTROL PLATE 36
TRACK 36B
TONE ARM CONTROL ASSEM. 31
STOP TAB 36A
RISER PLATE TAB 37B
RISER PLATE ASSEM. 37
BRACKET 31C
RISER PLATE MOTION BRACKET 37A
MS171

FIG. 2

FUNCTIONS OF PRINCIPAL PARTS

Head Assembly—7, 7A, 7B, 7C

Supports outer edge of record stack and pushes the record off notch in center post and allows it to drop to the turntable while the mechanism is going through cycle.

Center Post—27, 27A

Supports the entire stack of records, and together with the offset notch and latch in the center post, provides a means for separating records.

Tone Arm Lift Assembly—19

Couples tone arm to riser plate 37 through arm lift shaft 42A, thereby transferring the action for the vertical motion of the tone arm during change cycle.

Arm Control Assembly—31, 31A, 31B, 31C

Provides a tie between tube 31B, bracket 31C and tone arm support bracket 22, thereby directing the horizontal movement of the tone arm during change cycle. Arm control pin 31A slides along track in arm control plate 36, and in so doing, determines the point of landing of the pickup and the point of trip of the mechanism. It also incorporates landing adjusting screw 32.

Arm Control Plate Assembly—36, 36A, 36B, 36C

Incorporates a track 36B which controls the pickup landing and the tripping of the mechanism.

Stop tab 36A functions as portion of the tripping device, stud 36C, contacting push-off cam 42 controls, the point of landing for both 10- and 12-inch records.

Riser Plate Assembly—37, 37A, 37B, 37C

Provides mounting for eccentric cam 43, and incorporates an inclined track 37C, which controls the vertical movement of the tone arm.

Riser plate tab 37B pushes against curved portion of cam on arm control assembly 31, providing a control for the horizontal movement of tone arm during change cycle.

Riser plate bracket 37A contacting push-off arm 42B provides the necessary motion for push plate 7C.

Eccentric Cam—43

Transfers motion from turntable to riser plate 37 while cycling.

Push-Off Cam and Shaft Assembly—42, 42A, 42B

Provides a means of mechanically coupling tone arm lift 19 and push plate 7 assemblies to main cycling mechanism.

Cam 42B contacting stud 36C controls the position of arm control plate while in cycle, which determines the landing point of the pickup on 10- or 12-inch records.

Turntable Mounting and Guide Rod Assembly—51, 51A

Incorporates the main bearings for the turntable and provides a mounting for guide rods 51A.

ADJUSTMENTS

Tone Arm Adjustment

The tone arm height should be so adjusted as to permit the sapphire to engage and ride in the grooves of one record placed on the turntable, but at the same time prevent the tone arm from touching the records on the supports while the mechanism is going through cycle, fig. 5.

1. With the mechanism out of cycle, lift tone arm and check, and make certain tone arm lift 19 engages pin 14 as shown in fig. 6.
2. With the pickup near the edge of the record, loosen the set screw (with Bristo Wrench #6), holding collar 10, fig. 9, and moving it up or down on shaft 42A, so as to have the conditions indicated in sketch, fig. 5.

Preliminary Landing Adjustments

An accessible landing adjustment screw 32 is provided, but if for any reason the tone arm support bracket has become loose or removed, proceed as follows:

1. With the mechanism out of cycle turn adjustment screw 32, fig. 8, clockwise as far as it will go, then turn counterclockwise two or three full turns.
2. Set head assembly for 12-inch position; place a 12-inch record on turntable.
3. Press down on the reject button and rotate the turntable by hand, causing the mechanism to cycle until the pickup is about to land on the record. In this position, the arm control pin 31A is in a position on track 36B as indicated by "s" and adjustment screw 32 remains against bracket 31C as indicated in fig. 8.
4. Loosen the two set screws holding the tone arm support bracket.
5. While holding this position, place the sapphire in the starting groove of the record and tighten two set screws in the tone arm support bracket.

Final Landing Adjustment

The exact landing adjustment can be made by pressing the reject button and rotating the turntable by hand until the pickup is about to land. Then turn adjustment screw 32, fig. 8, until the sapphire is directly above the starting groove of the record. If the mechanism continues to land incorrectly after this adjustment has been made, compensate the difference by turning the screw 32 slightly. Turning screw counter-clockwise will move the landing towards the center post.

Positioning Push-Off Arm

1. With the mechanism out of cycle, turn the push-off cam to such a position, so that the arm makes a 90° angle with the slide bars as shown in fig. 10. Make certain the large radius side of cam is toward the stud 36C when the support post is in the 12-inch position.
2. Place push-off arm 5 over push-off cam shaft 42A, and engage push-off plate pin 7A near the top edge, fig. 7. Tighten set screws.
3. Press down on reject button and rotate the turntable slowly by hand, making certain push plate does not reach its limit, or push-off arm does not come down against push plate when the riser plate is in its outermost position. If push plate should reach limit, or push-off arm should come down against push plate before riser plate reaches its outermost position, back-off either one until corrected.
4. Check this for both 10- and 12-inch setting.

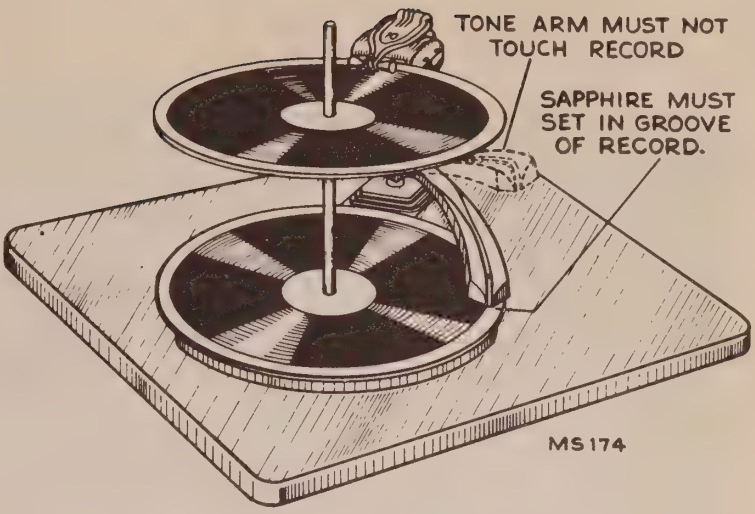

TONE ARM MUST NOT TOUCH RECORD
SAPPHIRE MUST SET IN GROOVE OF RECORD.
MS174

FIG. 5

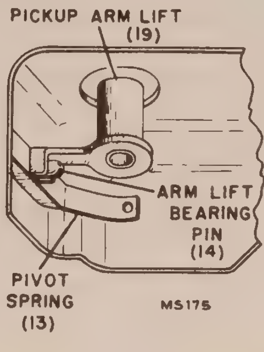

PICKUP ARM LIFT (19)
ARM LIFT BEARING PIN (14)
PIVOT SPRING (13)
MS175

FIG. 6

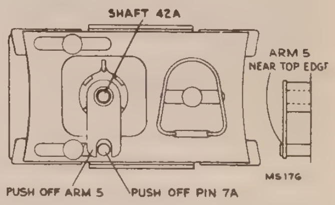

SHAFT 42A
ARM 5 NEAR TOP EDGE
MS176
PUSH OFF ARM 5
PUSH OFF PIN 7A

FIG. 7

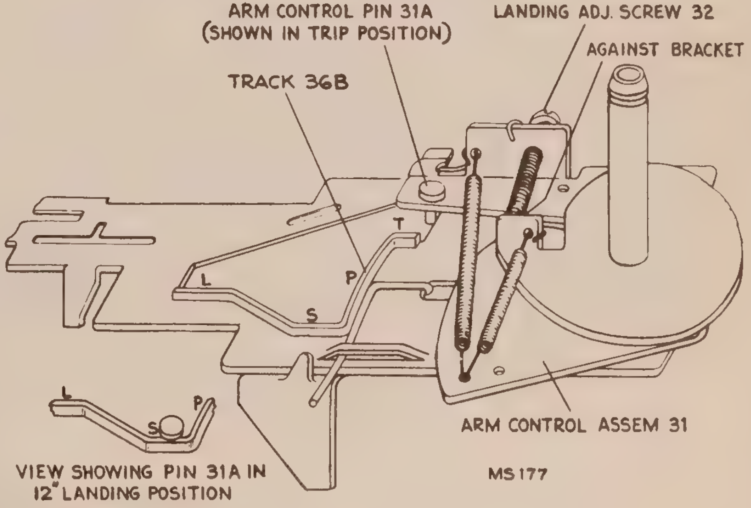

ARM CONTROL PIN 31A (SHOWN IN TRIP POSITION)
LANDING ADJ. SCREW 32
AGAINST BRACKET
TRACK 36B
T
L
P
S
L
P
S
ARM CONTROL ASSEM 31
VIEW SHOWING PIN 31A IN 12" LANDING POSITION
MS177

FIG. 8

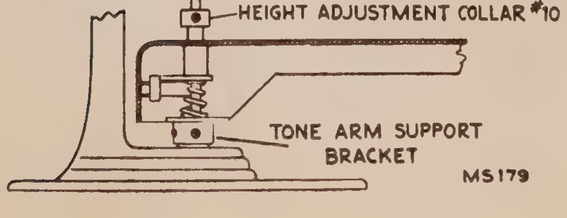

TONE ARM
HEIGHT ADJUSTMENT COLLAR #10
TONE ARM SUPPORT BRACKET
MS179

FIG. 9

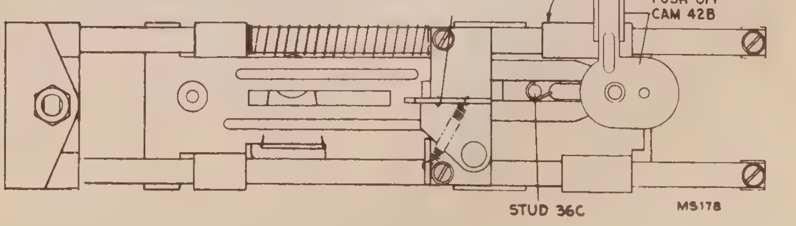

CAM 42B SHOWN IN 10" PLAYING POSITION
90°
PUSH OFF CAM 42B
STUD 36C
MS178

FIG. 10

NOTE—See Page 11 for illustration showing placement of coil spring type of Tone Arm Travel Retard Spring (Stock No. 71549).

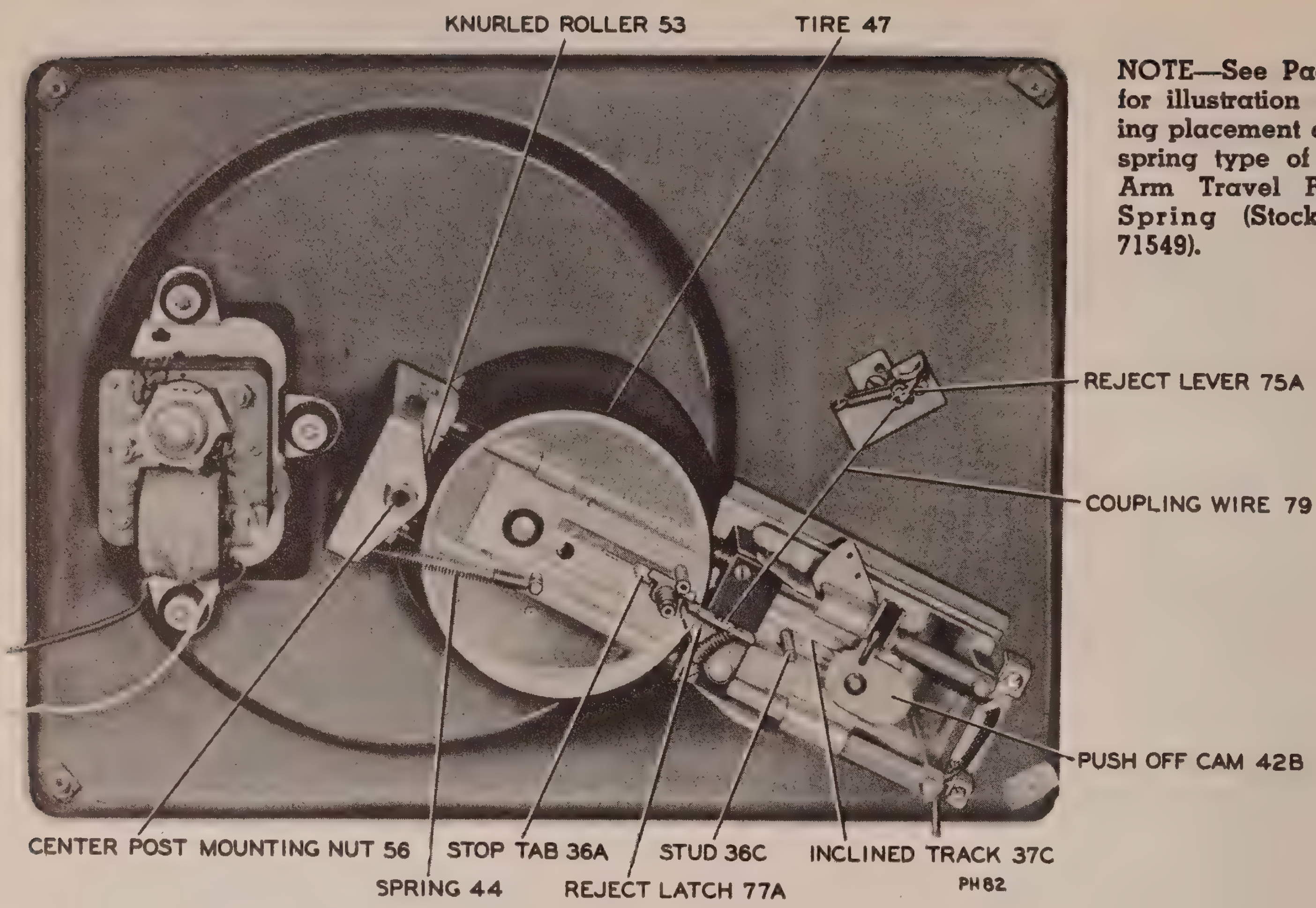

KNURLED ROLLER 53
TIRE 47
REJECT LEVER 75A
COUPLING WIRE 79
PUSH OFF CAM 42B
CENTER POST MOUNTING NUT 56
STOP TAB 36A
STUD 36C
INCLINED TRACK 37C
SPRING 44
REJECT LATCH 77A
PH82

FIG. 11

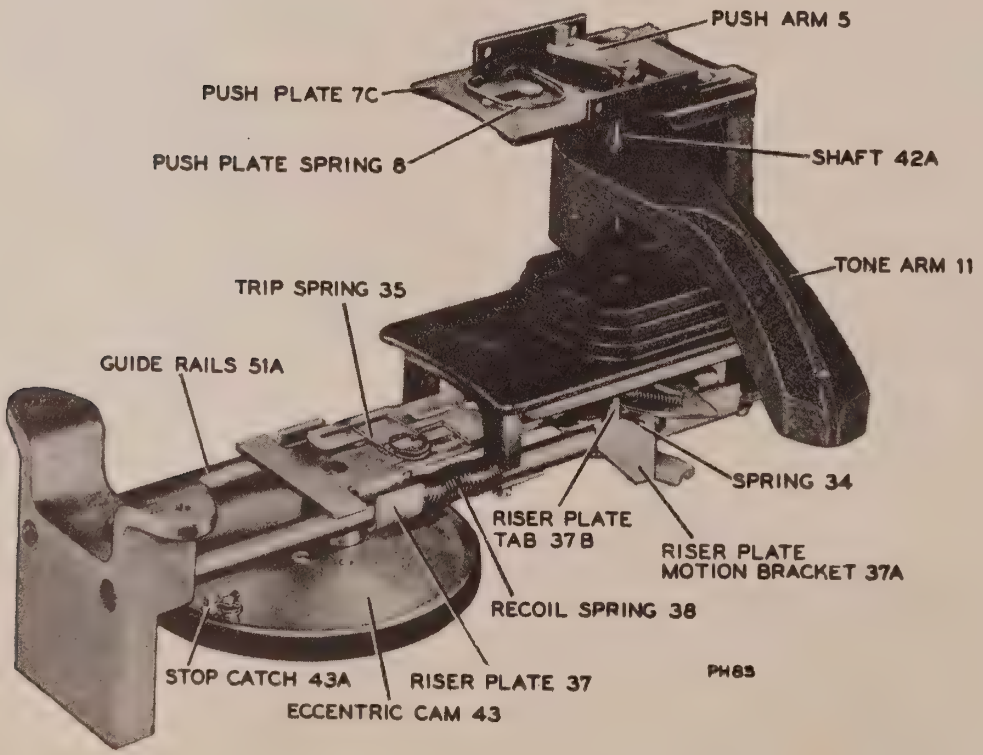

PUSH ARM 5
PUSH PLATE 7C
PUSH PLATE SPRING 8
SHAFT 42A
TONE ARM 11
TRIP SPRING 35
GUIDE RAILS 51A
SPRING 34
RISER PLATE TAB 37B
RISER PLATE MOTION BRACKET 37A
RECOIL SPRING 38
STOP CATCH 43A
RISER PLATE 37
ECCENTRIC CAM 43
PH83

FIG. 12

CYCLE OF OPERATION

Turn record support to 10- or 12-inch position as desired and place a stack of records on supports.	1. Turning record support positions the push-off cam 42B through the linkage of push-off arm 5 and push-off shaft 42A. In so doing it determines the distance of movement of control plate 36 which governs pickup landing.
Reject button.	1. Press down on tone arm; this actuates reject button on which it is resting. 2. Reject button actuates reject lever. 3. Reject lever transfers action to reject latch 77A through coupling wire 79. 4. The unlatching of reject latch allows eccentric cam 43 to be pulled against rotating knurled roller 53 which starts cycle.
Record plays.	1. While the record is being played and the tone arm moves towards the center of the record, the arm control pin 31A on arm control assembly 31 moves along track 36B as designated by "P," fig. 13. 2. As pickup moves into trip groove on record, tone arm control pin 31A moves into recess in control plate 36 at point indicated by "T," fig. 13. 3. Trip spring 35 pulls arm control plate 36 towards center post 27, and in so doing allows stop tab 36A on arm control plate 36 to stop catch 43A on eccentric cam 43.
Cycling starts.	1. Spring 44 pulls eccentric cam 43, causing rubber tire 47 to engage rotating knurled roller 53. 2. Eccentric cam 43 mounted on riser plate transfers energy to force the riser plate assembly back along the guide rails 51A away from center post 27. 3. As riser plate moves, the push-off cam and shaft assembly 42 rides along the inclined track 37C of the riser plate 37. 4. This action results in the push-off cam and shaft assembly 42 being pulled down.
Tone arm raises and moves out.	1. The tone arm lift 19 sliding on shaft 42A is pulled downward, contacting lift bearing pin 14, and causing tone arm to raise and clear record. 2. The riser plate tab 37B contacting curved portion of arm control assembly 31, which is coupled to tone arm support bracket assembly, causes the tone arm to be moved outward away from, and clears the edge of the records. Arm control plate is also being carried along by tab 37B contacting spring 34.
Record is separated and drops to turntable.	1. As riser plate 37 continues to travel further along guide rods 51A, the riser plate motion bracket 37A contacts and rotates the push-off cam and shaft assembly 42. 2. Push-off arm 5, being coupled to push-off cam and shaft assembly 42, is rotated, causing push plate 7C to push record off of projection on center-post and dropping it to the turntable. **Note:** The small separator latch 27A in the end of the center post functions as a thickness gauge, allowing only one record to be pushed off the projection at one time.
Mechanism continues to cycle, returning tone arm and positioning it for landing.	1. As eccentric cam 43 is returning to minimum diameter (out of cycle position), riser plate is being pushed back to normal position by recoil spring 38. At the same time, the push plate spring 8 is pushing the push plate 7C and push-off arm 5 back to normal position. 2. The portion of arm control assembly mounting the control pin 31A, and the control bracket 31C, are hinged on the plate forming part of assembly 31. Since the pin 31A has followed the track 36B and the curved portion of bracket 31C was forced out by motion of tab 37B, the tension of spring 30 is tending to pull them together as the riser plate is returning to normal position. The governing factor in determining how far the bracket will be pulled in, is the setting of the landing adjustment screw 32.
Pickup lands.	1. During part of the change cycle when riser plate was in the outermost position, and carrying arm control plate along by tab 37B contacting spring 34, the stud 36C is stopped by cam 42B. This acts as a gauge to determine the point of contact of pin 31A on arm control track 36B. This cam having two different radii will govern the distance arm control plate can travel since this is set when the record size change is made. If the smaller radius side of cam 42B is toward stud 36C, the arm control pin 31A will ride portion of track 36B designated by "L," causing the pickup to land on 10-inch records. On the other hand, if the larger radius portion of cam is toward the stud, the pin will ride along track designated by "S," which determines landing point on 12-inch records.

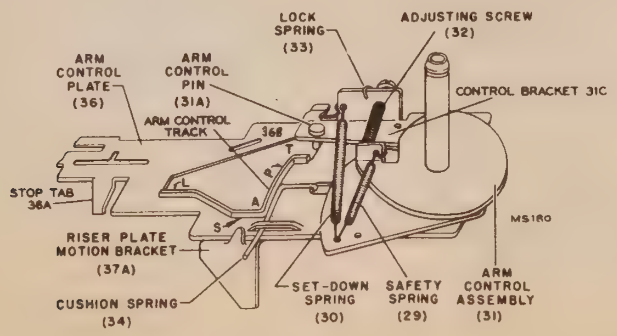


FIG. 13

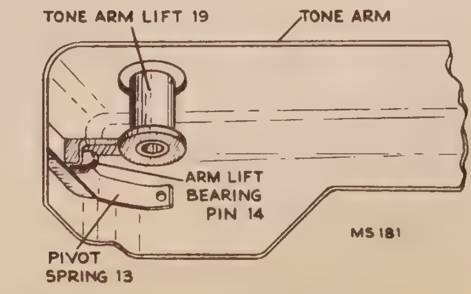
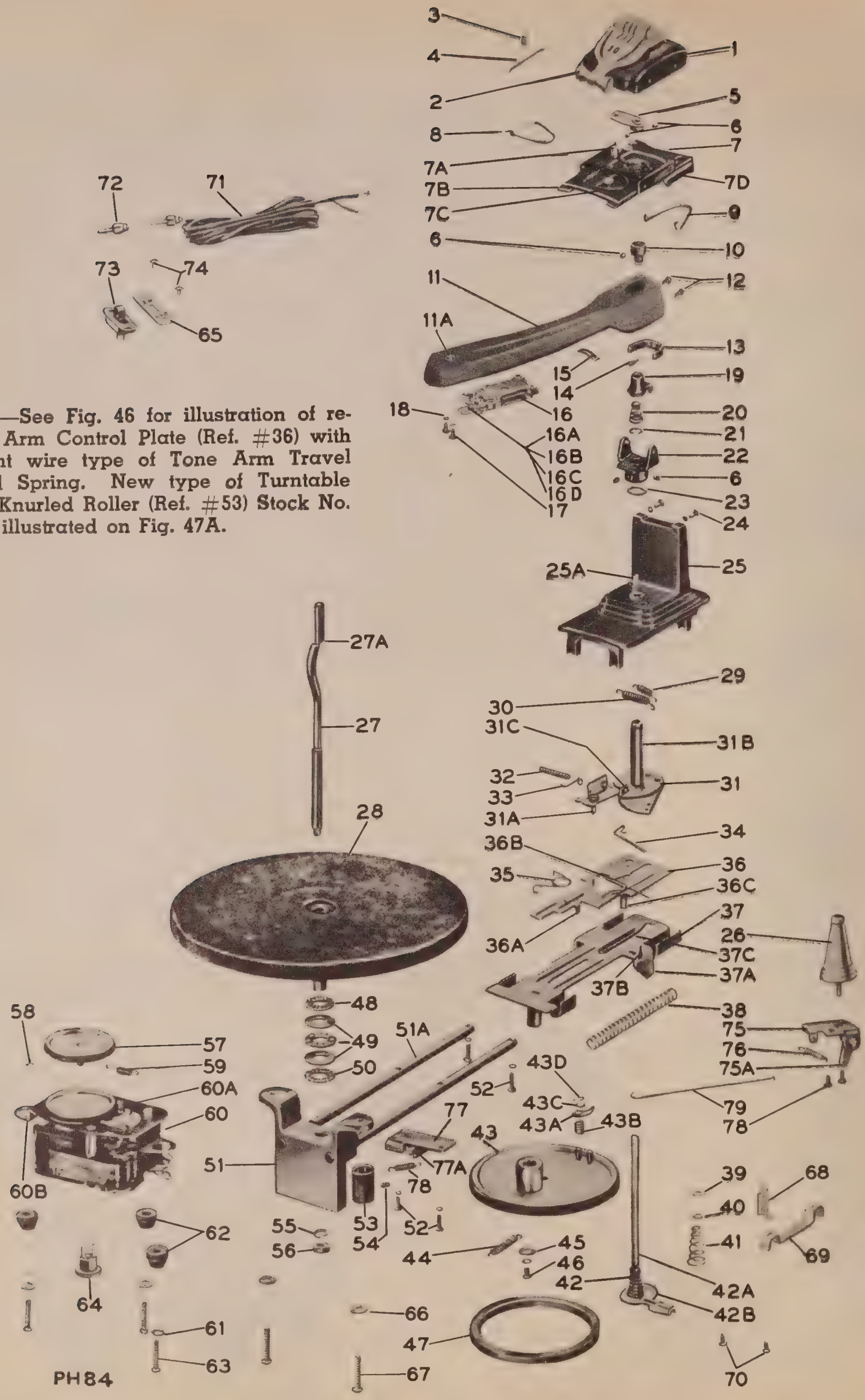


FIG. 14

NOTE—See Fig. 46 for illustration of revised Arm Control Plate (Ref. #36) with straight wire type of Tone Arm Travel Retard Spring. New type of Turntable Shaft Knurled Roller (Ref. #53) Stock No. 72926 illustrated on Fig. 47A.


3
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7A
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7D
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11A
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16A
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16B
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16C
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16D
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17
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25A
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27A
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30
31C
31B
27
32
31
33
31A
28
34
36B
36
35
36C
37
36A
26
37C
37A
37B
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75
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51A
76
59
50
43D
75A
52
60A
43C
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43A
43B
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77A
78
60B
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56
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41
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44
45
46
64
42
42A
42B
66
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47
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67
PH84

PHOTOGRAPH OF PARTS

FIG. 15

Replacement Parts

REF. No.	STOCK No.	DESCRIPTION
		OPERATING ASSEMBLIES
1*	72456	Cover—Cover assembly, including record clip rod (4) and spring (3)
	72457	Fastener—Cover assembly (1) push fastener (4 required) (used on some models)
2†	—	Clip—Plastic clip, part of item (1)
3	71232	Spring—Record clip spring
4	71233	Rod—Record clip spring rod
5*	72458	Arm—Push-off arm
6†	—	Screw—Adjusting screw for collar (10) and arm (5)
7	72459	Slide—Slide assembly, including push plate pin (7A), rotating plate (7B), push plate (7C), mounting plate (7D), push plate spring (8), mounting plate spring (9)
8*	72460	Spring—Push plate spring (located on top of push plate)
9	71211	Spring—Head mounting plate spring (located on bottom of mounting plate)
10	72461	Collar—Lift adjusting collar
11	71283	Arm—Tone arm, including tone arm eye (11A), pivot spring (13), arm lift bearing pin (14)
12†	—	Rivets—Included in item (11)
13†	—	Spring—Spring pivot, included in item (11)
14†	—	Stud—Arm lift bearing pin, included in item (11)
15	71169	Clip—Spring clip to hold pickup leads in arm
16	70338	Crystal—Crystal cartridge complete with guard and sapphire.
16A	72345	Sapphire—Sapphire and holder assembly
16B	38452	Guard—Sapphire guard
16C	37763	Screw—#2-56 x ⅛″ screw for sapphire guard
16D	70341	Nut—Mounting washer and nut for sapphire
17†	—	Screw—Mounting screws for pickup
18†	—	Washer—Lockwasher for mounting pickup
19	72462	Lift—Tone arm lift
20	72463	Spring—Brake spring
21	72464	Ring—Arm control support tube retaining ring
22	72465	Support—Tone arm support
23	72466	Washer—Spring washer
24†	—	Screw—Mounting screws for item (7)
25	72467	Base—Operating mechanism mounting base, less all removable parts
26	72468	Rest—Tone arm rest and reject button
27	71235	Centerpost
28	71237	Turntable
29	72469	Spring—Safety spring
30	72470	Spring—Landing tension spring
31	72471	Control—Arm control comprising bracket (31C), support tube and arm (31B), control pin (31A)
32	72472	Screw—Landing adjustment screw.
33	72473	Spring—Lock spring (for landing adjustment)
34	72474	Spring—Cushion spring
35	72475	Spring—Trip spring
36	72476	Plate—Arm control plate, including stop tab (36A), track (36B), size change stop stud (36C)
37	72477	Riser—Riser plate assembly, including motion bracket (37A), plate tab (37B), inclined track (37C)
38	71191	Spring—Recoil spring
39†	—	Washer—Included with item (42)
40†	—	Washer—Included with item (42)
41†	—	Spring—Included with item (42)
42	72478	Cam—Push-off cam (42B) and shaft (42A)
43	72479	Cam—Eccentric cam and tire, including 43A, B, C, D
43A	72485	Catch—Reject catch
43B	72486	Spring—Reject catch support spring
44	72480	Spring—Eccentric cam spring
45†	—	Washer—Used for mounting eccentric cam
46†	—	Screw—Eccentric cam mounting screw
47	71198	Tire—Rubber tire only for eccentric cam
48	71239	Washer—One set of cork washers for turntable
49	71238	Bearing—Turntable thrust bearing (including 2 washers)
50†	—	Washer—Included with item (49)
51	71188	Support—Turntable mounting support, including guide rods
52†	—	Screw—Mounting screws for guide rods
53	72926	Roller—Turntable shaft knurled roller
54	71200	Screw—#8-32 x ⅛″ Bristol set screw for knurled roller
55†	—	Washer—Lockwasher for mounting center post
56	71236	Nut—Hex nut for centerpost
57	71175	Wheel—Drive idler wheel for motor stamped 407B1
	71179	Wheel—Drive idler wheel for motor stamped 407B2
	71184	Wheel—Drive idler wheel for motor stamped 407B3
	71413	Wheel—Drive idler wheel for motor stamped 407B9
58	71177	Pin—Cotter pin (hairpin spring) for drive idler wheel on motor
59	71176	Spring—Drive idler wheel tension spring for motor stamped 407B1 or 407B6
	71180	Spring—Drive idler wheel tension spring for motor stamped 407B2, 407B7 or 407B10
	71185	Spring—Drive idler wheel tension spring for motor stamped 407B3
	71414	Spring—Drive idler wheel tension spring for motor stamped 407B9
		NOTE: When replacing complete motor, order by Stock Nos. below. Motors stamped 407B1, 407B2, 407B3, 407B9, 407B10 are 60 cycle motors. Motors stamped 407B6 or 407B7 are 50 cycle motors.
60*	71183	Motor—Motor complete with drive idler (57), tension spring (59), mounting grommets (62), shaft bushing (60A), mounting bracket (60B), less power cord
	72729	Motor—Motor complete with drive idler (57), tension spring (59), mounting grommets (62), shaft bushing (60A), mounting bracket (60B), less power cord
60A	71186	Bushing—Motor shaft drive pulley for motor stamped 407B3
61†	—	Washer—Motor mounting washer
62†	—	Grommet—Motor mounting grommet
63†	—	Screw—Motor mounting screw
64	30870	Plug—2-prong male plug for motor cable
65	72488	Escutcheon—"On-Off" switch escutcheon for 960260-1 & 960260-3
66†	—	Washer—Used in mounting support (51)
67†	—	Screw—Used to mount support (51)
68†	—	Terminal—Pickup lead terminal strip
69†	—	Bracket—Base mounting bracket
70†	—	Screws—Mounting screws for bracket (69)
71	39386	Cable—Shielded output cable with pin plug for 960260-1, -2 & -4
72	31048	Plug—Pin plug for pickup cable
73	72487	Switch—"On-Off" switch for 960260-1 & -3
74†	—	Screw—Mounting screw for switch (73)
75	72482	Lever—Reject lever
76†	—	Spring—Reject lever spring
77	72484	Plate—Reject mounting plate and arm
78†	—	Screw—Reject lever mounting screws
79	72483	Wire—Reject trigger wire
	71549	Spring—Tone arm travel retard spring (coil spring) See page 11

† These parts are not stocked.

* Motors:
Stock No. 71183 is complete 60 cycle motor.
Stock No. 72729 is complete 50 cycle motor.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

Changer Will Not Complete Cycle

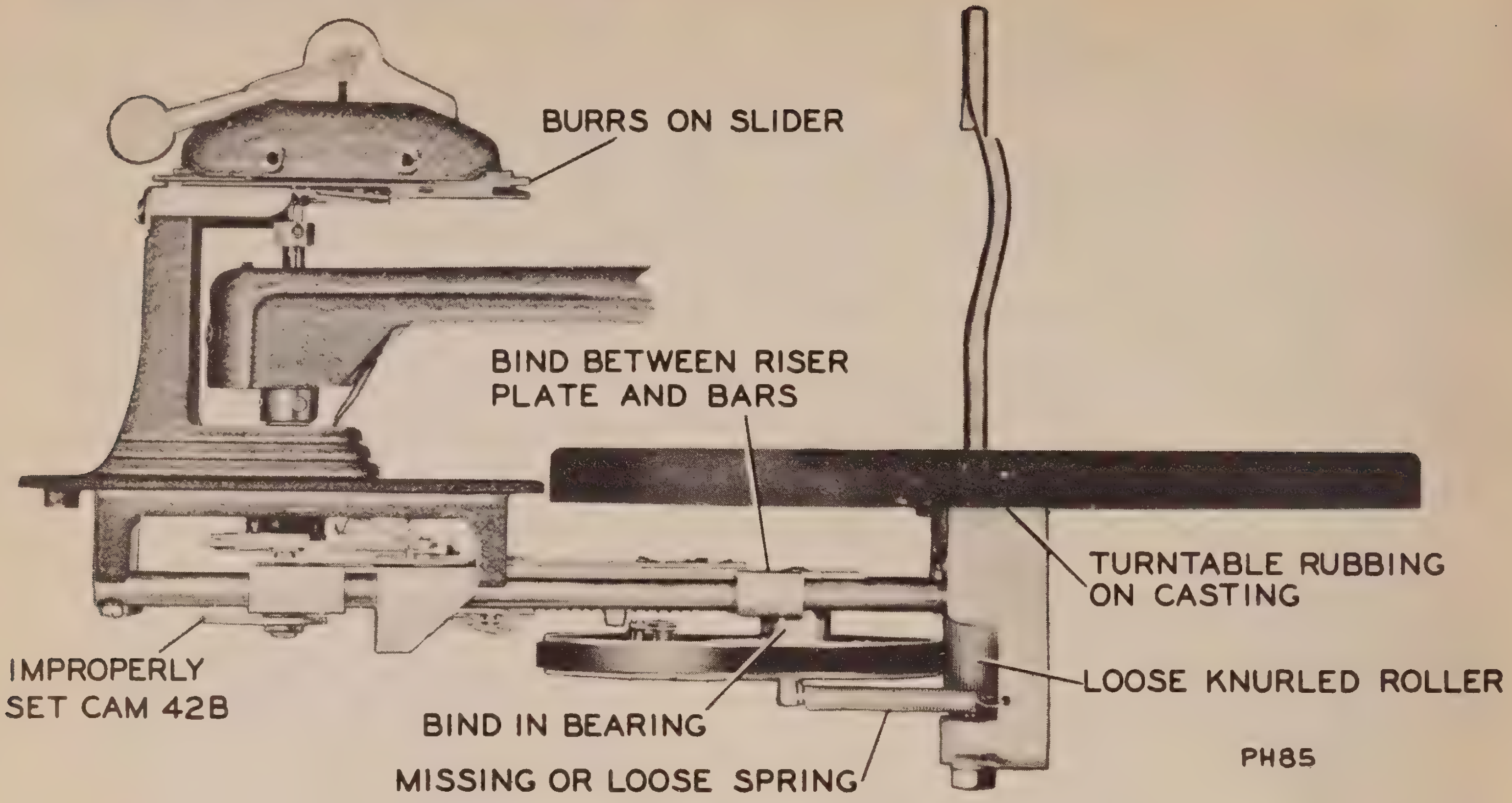

BURRS ON SLIDER
BIND BETWEEN RISER PLATE AND BARS
TURNTABLE RUBBING ON CASTING
LOOSE KNURLED ROLLER
IMPROPERLY SET CAM 42B
BIND IN BEARING
MISSING OR LOOSE SPRING
PH85

FIG. 16

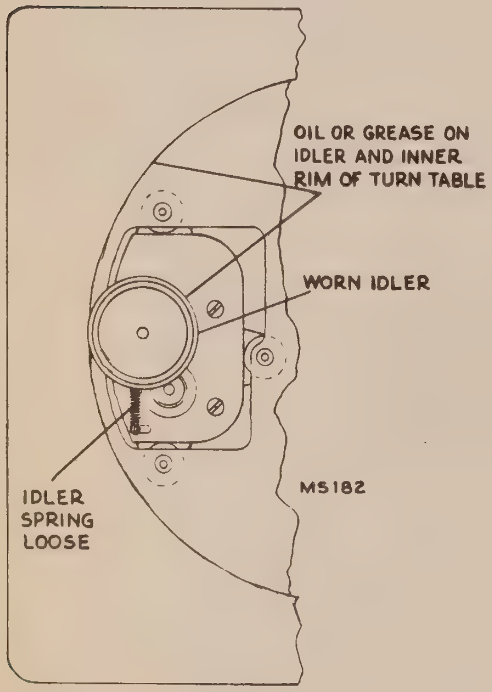

OIL OR GREASE ON IDLER AND INNER RIM OF TURN TABLE
WORN IDLER
IDLER SPRING LOOSE
MS182

FIG. 17

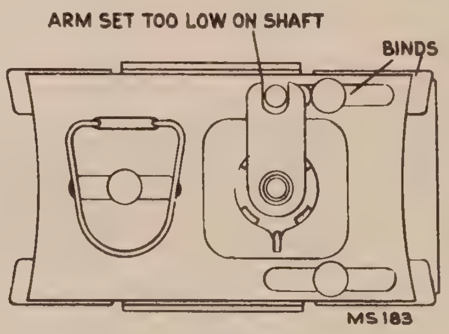

ARM SET TOO LOW ON SHAFT
BINDS
MS183

FIG. 18

Records Do Not Separate or Drop Properly

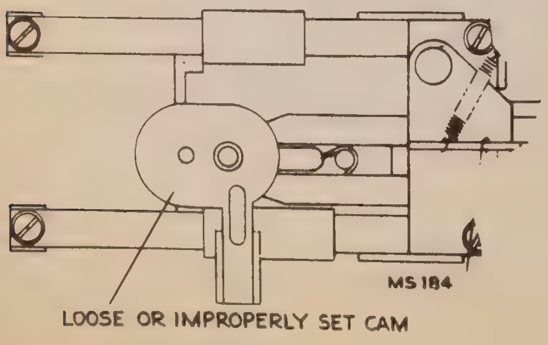

MS184
LOOSE OR IMPROPERLY SET CAM

FIG. 19

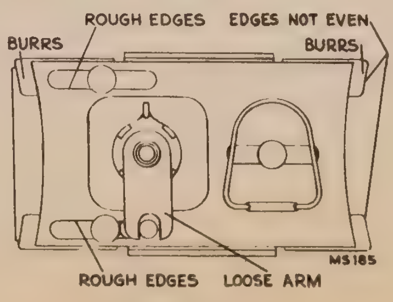

ROUGH EDGES
EDGES NOT EVEN
BURRS
BURRS
ROUGH EDGES
LOOSE ARM
MS185

FIG. 20

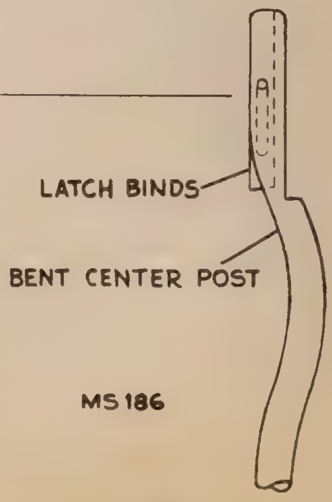

A
LATCH BINDS
BENT CENTER POST
MS186

FIG. 21

Pickup Repeats Grooves

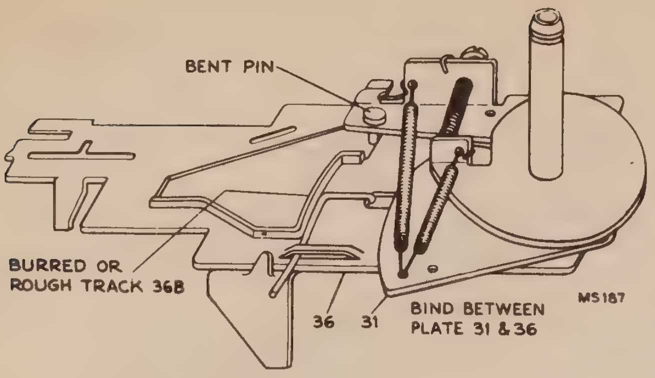

BENT PIN
BURRED OR ROUGH TRACK 36B
36
31
BIND BETWEEN PLATE 31 & 36
MS187

FIG. 22

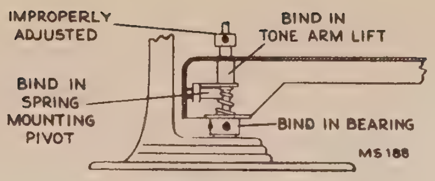

IMPROPERLY ADJUSTED
BIND IN TONE ARM LIFT
BIND IN SPRING MOUNTING PIVOT
BIND IN BEARING
MS188

FIG. 23

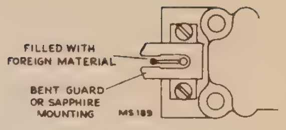

FILLED WITH FOREIGN MATERIAL
BENT GUARD OR SAPPHIRE MOUNTING
MS189

FIG. 24

"Wow" or Slow Turntable Speed

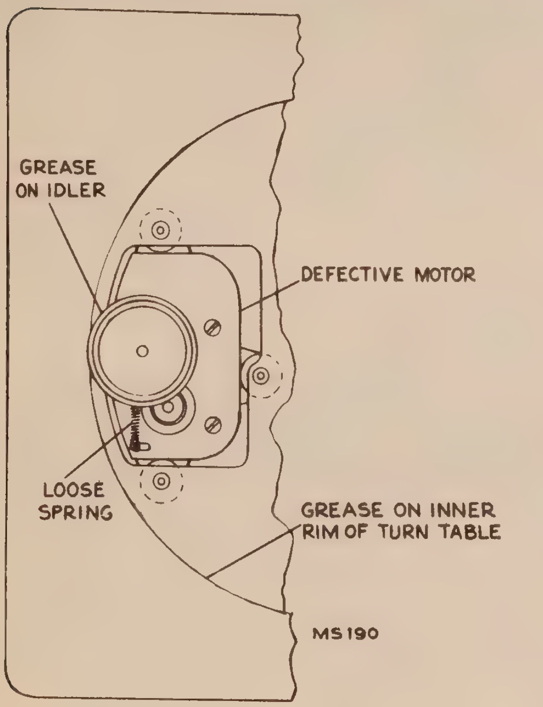

GREASE ON IDLER
DEFECTIVE MOTOR
LOOSE SPRING
GREASE ON INNER RIM OF TURN TABLE
MS190

FIG. 25

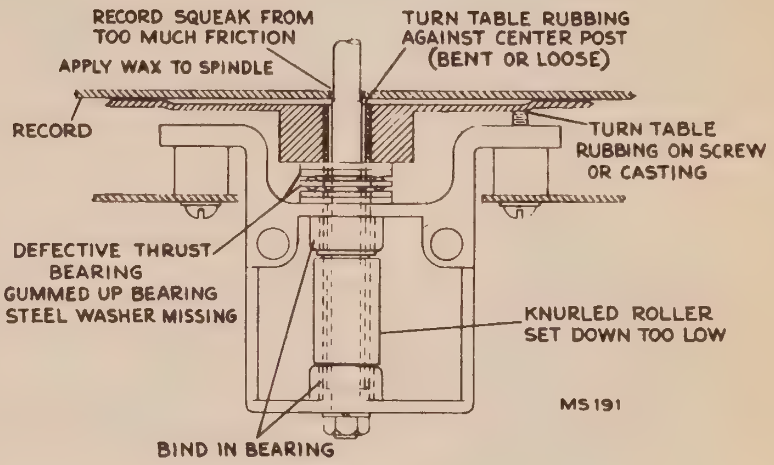

RECORD SQUEAK FROM TOO MUCH FRICTION
APPLY WAX TO SPINDLE
TURN TABLE RUBBING AGAINST CENTER POST (BENT OR LOOSE)
RECORD
TURN TABLE RUBBING ON SCREW OR CASTING
DEFECTIVE THRUST BEARING
GUMMED UP BEARING
STEEL WASHER MISSING
KNURLED ROLLER SET DOWN TOO LOW
MS191
BIND IN BEARING

FIG. 26

Continuous Tripping

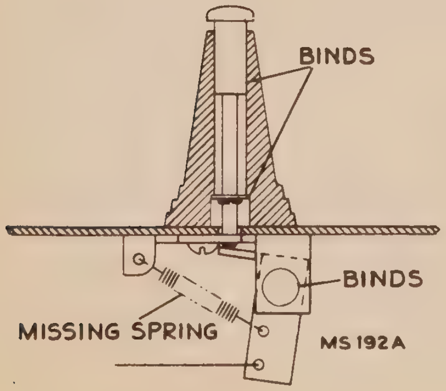

BINDS
BINDS
MISSING SPRING
MS192A

FIG. 27

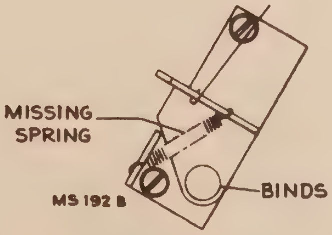

MISSING SPRING
BINDS
MS192B

FIG. 28

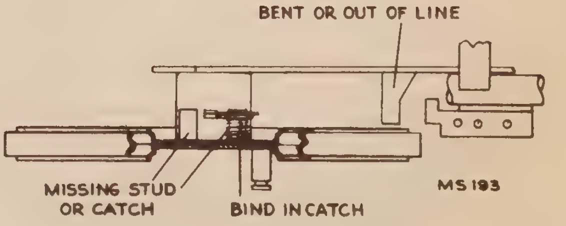

BENT OR OUT OF LINE
MISSING STUD OR CATCH
BIND IN CATCH
MS193

FIG. 29

Improper Pickup Landing

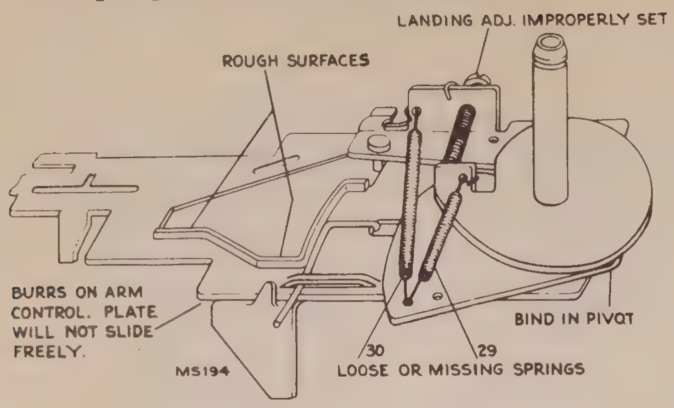

LANDING ADJ. IMPROPERLY SET
ROUGH SURFACES
BURRS ON ARM CONTROL. PLATE WILL NOT SLIDE FREELY.
MS194
BIND IN PIVOT
30
29
LOOSE OR MISSING SPRINGS

FIG. 30

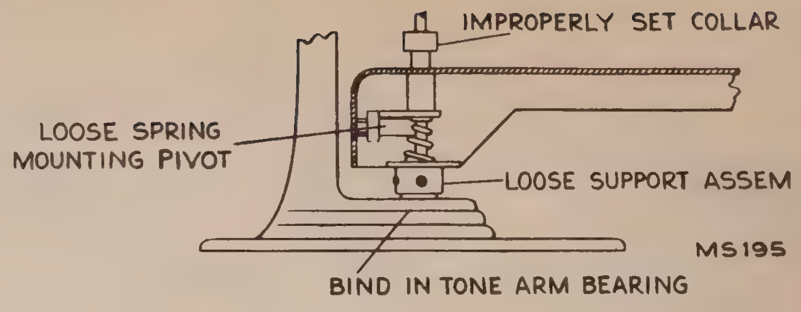

IMPROPERLY SET COLLAR
LOOSE SPRING MOUNTING PIVOT
LOOSE SUPPORT ASSEM
MS195
BIND IN TONE ARM BEARING

FIG. 31

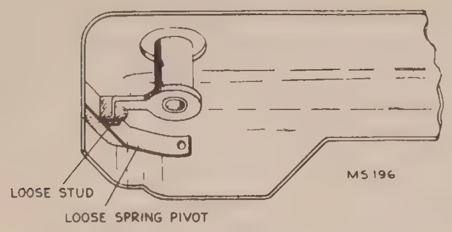

LOOSE STUD
LOOSE SPRING PIVOT
MS196

FIG. 32

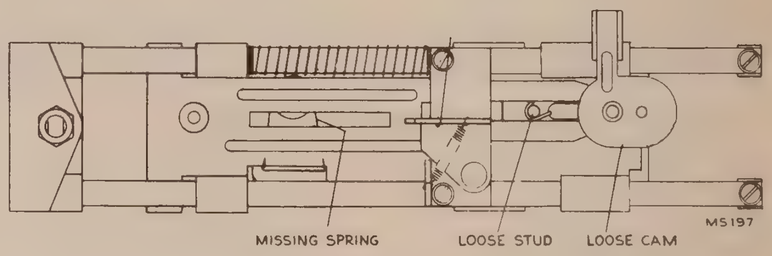

MISSING SPRING
LOOSE STUD
LOOSE CAM
MS197

FIG. 33

Failure to Trip or Go into Cycle

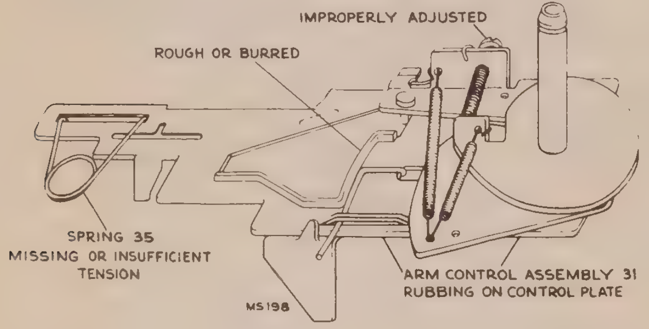

IMPROPERLY ADJUSTED
ROUGH OR BURRED
SPRING 35 MISSING OR INSUFFICIENT TENSION
MS198
ARM CONTROL ASSEMBLY 31 RUBBING ON CONTROL PLATE

FIG. 34

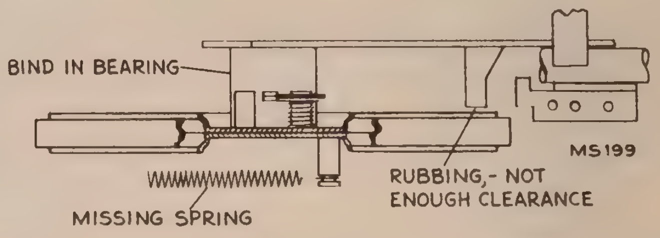

BIND IN BEARING
MS199
RUBBING,- NOT ENOUGH CLEARANCE
MISSING SPRING

FIG. 35

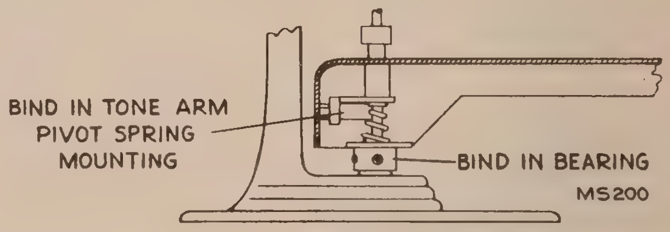

BIND IN TONE ARM PIVOT SPRING MOUNTING
BIND IN BEARING
MS200

FIG. 36

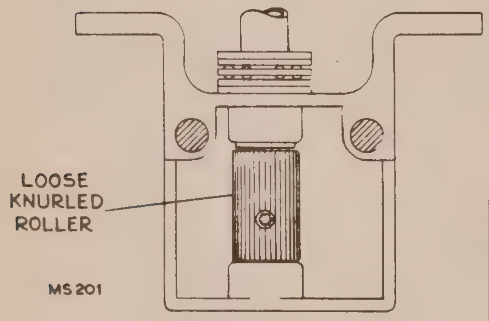

LOOSE KNURLED ROLLER
MS201

FIG. 37

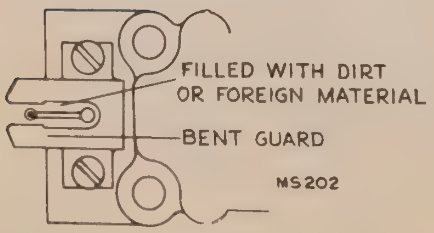

FILLED WITH DIRT OR FOREIGN MATERIAL
BENT GUARD
MS202

FIG. 38

Tone Arm Fails to Leave Rest Automatically

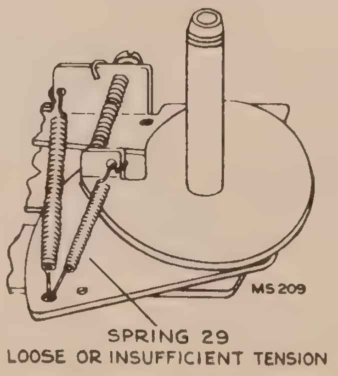

MS209
SPRING 29 LOOSE OR INSUFFICIENT TENSION

FIG. 39

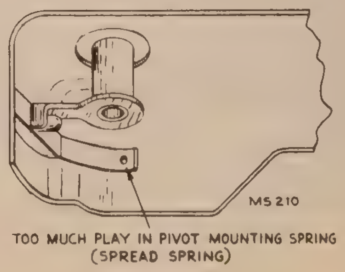

MS210
TOO MUCH PLAY IN PIVOT MOUNTING SPRING (SPREAD SPRING)

FIG. 39A

Premature Tripping

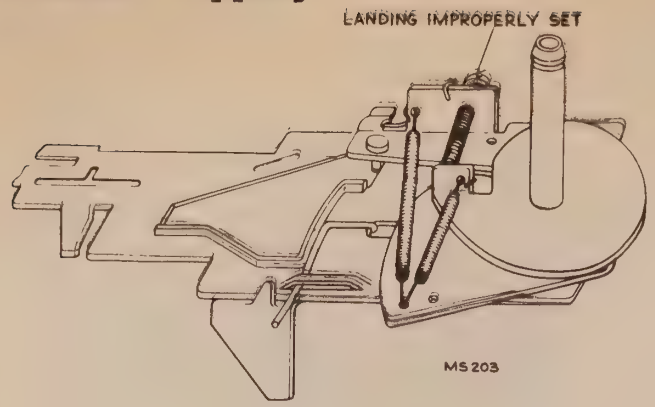

LANDING IMPROPERLY SET
MS203

FIG. 40

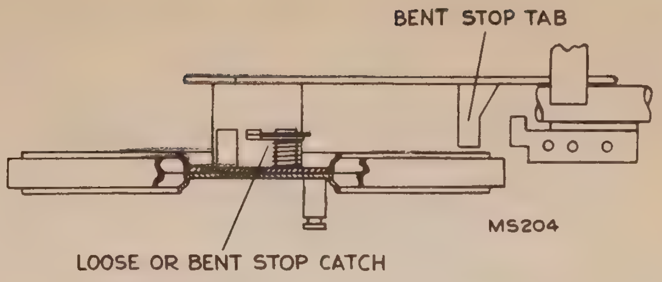

BENT STOP TAB
LOOSE OR BENT STOP CATCH
MS204

FIG. 41

Distorted or No Output

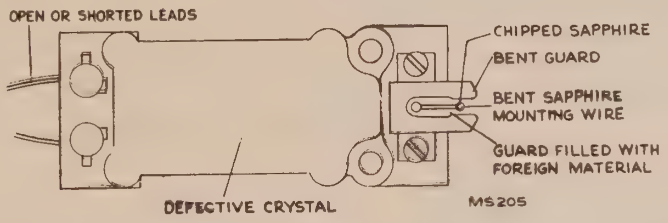

OPEN OR SHORTED LEADS
CHIPPED SAPPHIRE
BENT GUARD
BENT SAPPHIRE MOUNTING WIRE
GUARD FILLED WITH FOREIGN MATERIAL
DEFECTIVE CRYSTAL
MS205

FIG. 42

Rumble or Howl

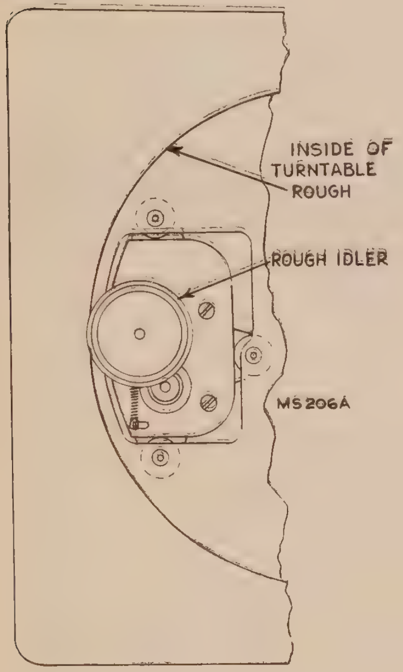

INSIDE OF TURNTABLE ROUGH
ROUGH IDLER
MS206A

FIG. 43

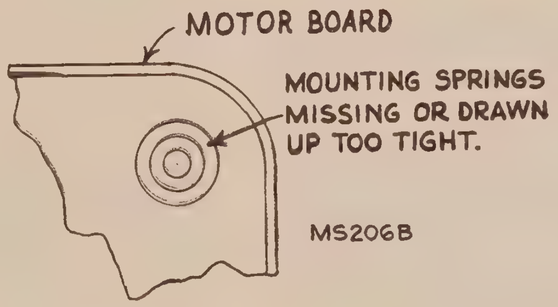

MOTOR BOARD
MOUNTING SPRINGS MISSING OR DRAWN UP TOO TIGHT.
MS206B

FIG. 44

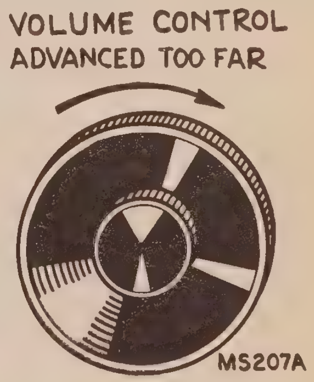

VOLUME CONTROL ADVANCED TOO FAR
MS207A

FIG. 45

Tone Arm Enters Label Area of Record (Travel Retard Spring Missing or Deformed)

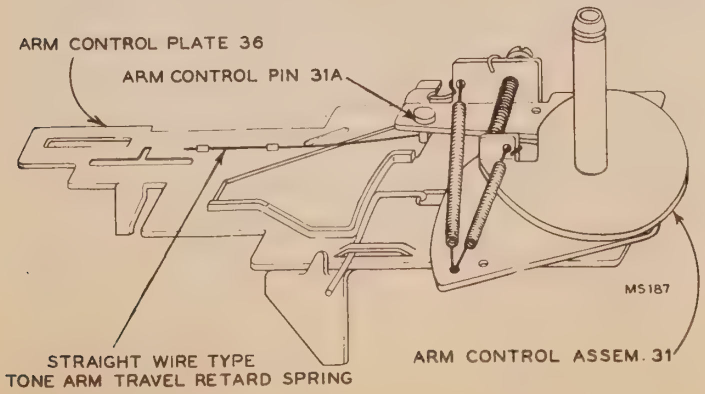

ARM CONTROL PLATE 36
ARM CONTROL PIN 31A
MS187
STRAIGHT WIRE TYPE TONE ARM TRAVEL RETARD SPRING
ARM CONTROL ASSEM. 31

FIG. 46

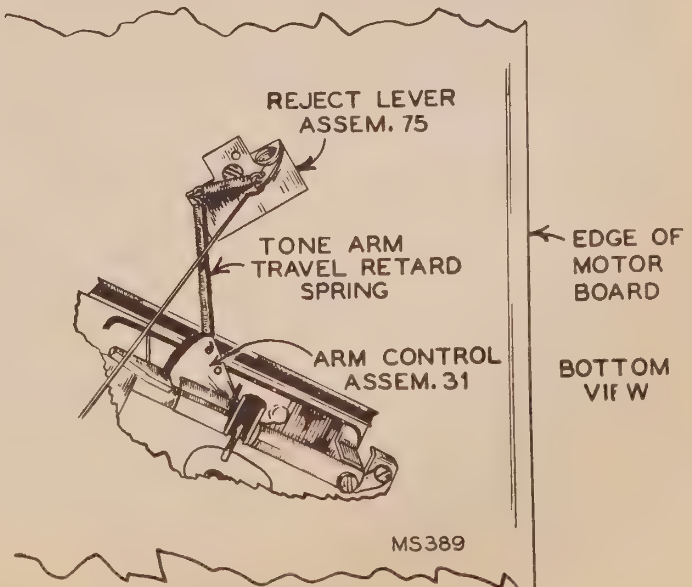

REJECT LEVER ASSEM. 75
TONE ARM TRAVEL RETARD SPRING
ARM CONTROL ASSEM. 31
EDGE OF MOTOR BOARD
BOTTOM VIEW
MS389

FIG. 46A

960260-1, -2, -3, -4

Stalling in Cycle at Low Line Voltage Use New Type Knurled Roller

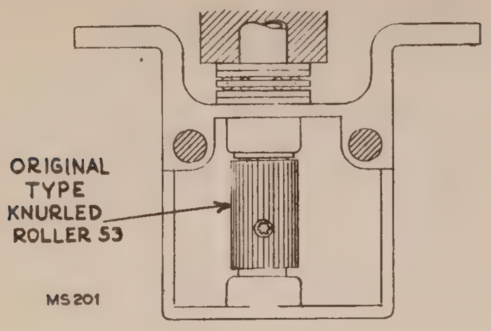


FIG. 47

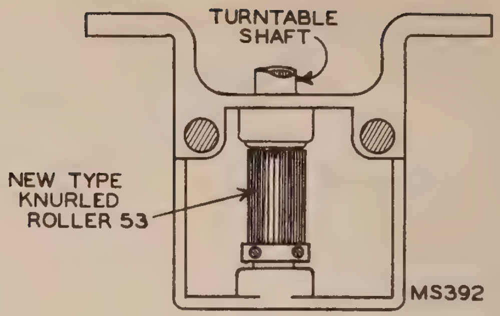


FIG. 47A

REPLACEMENT OF SAPPHIRE

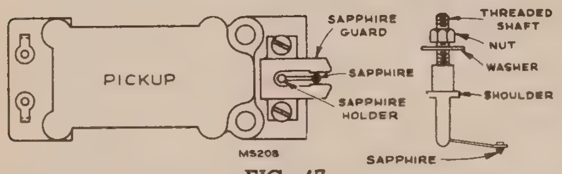


FIG. 47

Caution: Never bend the sapphire support wire.

Extreme care should be used when loosening the sapphire mounting nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

960260-2

ADDED RESISTOR

Late production of 65U, 65AU has an added resistor (270,000 ohms) connected across the phono input jack of the radic chassis. This resistor was on the record changer (960260-2) in the early production (Serial Nos. B-1001 to B-6000 and B-28,500 to B-30,000) of 65U, 65AU.

The location of this resistor may be checked by measuring the shunt resistance across the phono input jack of the radio chassis and across the phone output cable of the changer mechanism.

Its purpose is to prevent low frequency rumble and howl.

RECORD DAMAGE

The spindle shelf and the top of spindle shaft should be free from burrs or rough edges to avoid scratching records or damaging record center holes. The record shelf edge should be smooth and be rounded only to a minute radius. Never round the bottom edge of the record separator latch.

A slight application of wax on the spindle shaft will prevent "squeal" of a stack of records.

LUBRICATION

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

Main Bearing

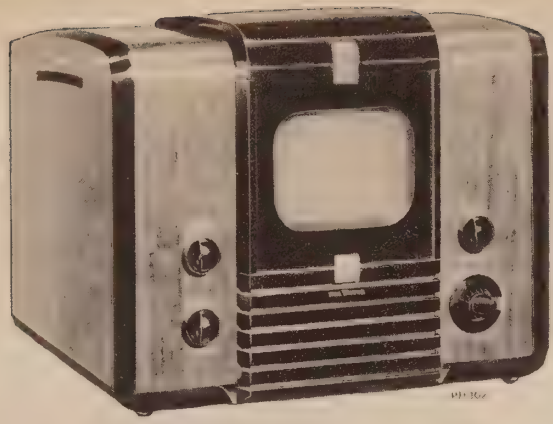
Use STA-PUT #512 or SAE #30 motor oil.

Slides and Levers

Use STA-PUT #512.

STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Phila., Pa.

RCA VICTOR



Model 621TS

TELEVISION RECEIVER MODEL 621TS

Chassis No. KCS 21-1—Mfr. No. 274

SERVICE DATA

—1946 No. T2—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 621TS is a twenty-one tube, direct-viewing, table-model Television Receiver having a 7" picture tube (Kinescope). The receiver is complete in one unit and is operated by the use of seven front-panel controls. Features of the receiver include: Full thirteen channel coverage; f-m sound system; improved picture brilliance; two stages of video amplification; stable horizontal and vertical hold controls; improved sync amplifier and separator; and reduced-hazard high-voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE........4¼" x 5⅝"—1/16" radius at corner

RADIO FREQUENCY RANGES

Channel Number	Channel Freq. Mc	Picture Carrier Freq. Mc	Sound Carrier Freq. Mc	Receiver R-F Osc. Freq. Mc
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 300 kc on channel 1, and plus and minus approximately 750 kc on channel 13.

POWER-SUPPLY RATING

115 Volts..............................60 cycles, 220 watts

AUDIO POWER-OUTPUT RATING

Undistorted..2 watts
Maximum..3 watts

LOUDSPEAKER (92565-1)

Type....................6 x 4 inch Electro Magnet Dynamic
Voice-Coil Impedance...............3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet......................60 lbs.
Shipping Weight..................................75 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE...............300 ohms balanced

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (Outside)	19	15¼	16¼
Chassis Base (Outside)	15⅜	4⅜	12⅞
Chassis Overall	15⅝	10⅞	15⅞

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5*	Sound Discriminator
(7)	RCA 6AT6	1st Audio Amplifier
(8)	RCA 6K6-GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6H6	Picture 2nd Detector and Sync Leveler
(13)	RCA 6SN7-GT	1st and 2nd Video Amplifier
(14)	RCA 6SN7-GT	Sync Amplifier and Sync Separator
(15)	RCA 6SN7-GT	Vertical Sweep Oscillator, Discharge and Vertical Sweep Output
(16)	RCA 6SN7-GT	Horizontal Sweep Oscillator and Discharge
(17)	RCA 6BG6-G	Horizontal Sweep Output
(18)	RCA 5V4-G	Damper
(19)	RCA 1B3-GT/8016	High Voltage Rectifier
(20)	RCA 5U4-G	Power Supply Rectifier
(21)	RCA 7DP4	Kinescope

* In some units, an RCA 6AT6 is used.

Specifications continued on page 2

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency	25.75 Mc
Accompanying Sound Traps	21.25 Mc

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency	21.25 Mc
Sound Discriminator Band Width (between peaks)	350 Kc

VIDEO RESPONSE	To 3 Mc
FOCUS	Electrostatic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)

Station Selector Fine Tuning	Dual Control Knob
Sound Volume and On-Off Switch	Single Control Knob
Horizontal (Picture Horizontal Hold) Vertical (Picture Vertical Hold)	Dual Control Knob
Picture (Contrast) Brightness (Brilliance)	Dual Control Knob

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustment
Height	rear chassis adjustment
Horizontal Linearity	top chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis adjustment
Focus	rear chassis adjustment
Ion Trap Magnet	top chassis thumb screw adjustment
Deflection Coil	top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH-VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH-VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE, OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb—particularly the rim of the viewing surface—must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly through the deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on Kinescope Installation. All RCA Kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

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RECEIVER OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the receiver "ON" and advance the SOUND volume control to approximately mid-position.

2. Set the STATION SELECTOR to the desired channel.

3. Turn the PICTURE control fully counterclockwise.

4. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a faint glow just appears on the screen.

5. Turn the PICTURE control approximately three-fourths clockwise.

6. Adjust the FINE TUNING control for best sound fidelity and the SOUND control for suitable volume.

7. Adjust the VERTICAL hold control until the pattern stops vertical movement. (See Note)

8. Adjust the HORIZONTAL hold control until a single stationary image of the pattern or picture appears on the screen. Then make careful adjustment to eliminate bend, distortion, or "tear away" at top of picture. (See Note)

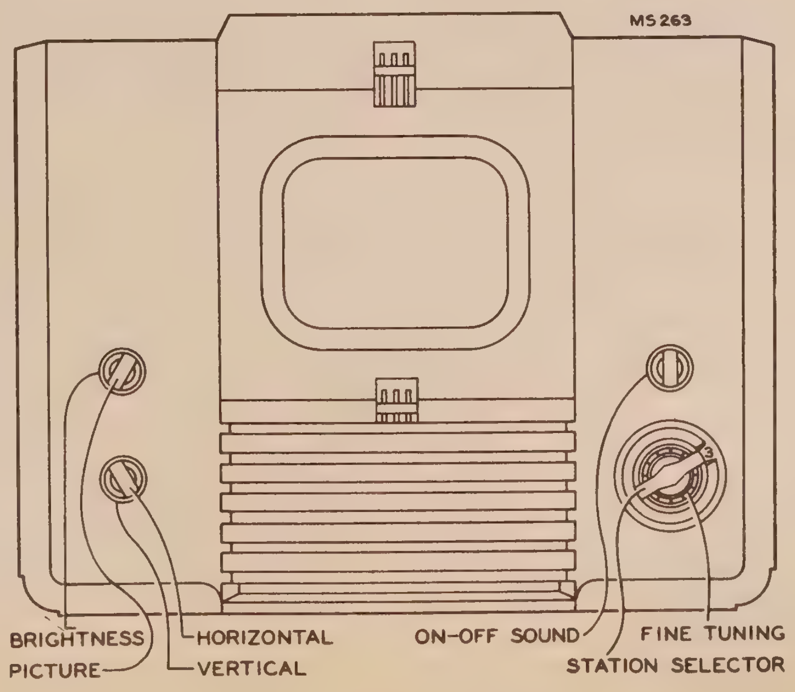


Figure 1—Receiver Operating Controls

9. Adjust the PICTURE control for suitable picture contrast. (See Note).

10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

11. In switching from one station to another, it may be necessary to repeat steps number 6, 7, 8 and 9.

12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 6 is generally sufficient.

13. If the positions of the controls have been changed, it may be necessary to repeat steps number 1 through 9.

NOTE: See page 13 for effects of improper adjustment of controls, and some conditions of reception.

It is advisable that the reader be familiar with a recent standard textbook of television principles in order to understand the receiver circuits and their functions. Such a knowledge is assumed for the purpose of this publication. The discussions which follow will not dwell on the operation of conventional circuits which have been used in previous receivers and which should be well known. In general, the circuits discussed will be only those that are new to the field.

For ease of understanding the basic operation of the receiver, an 11-unit block diagram is shown in Figure 2. The circuit description will follow the numerical order of these blocks in order to follow a signal logically through the set.

R-F UNIT (block No. 1)—The r-f unit is a separate subchassis of the receiver. On this subchassis are the r-f amplifier, converter, oscillator, fine tuning control, channel switch, converter transformer, and the r-f, converter, and oscillator coils and all their tuning adjustments. The unit provides operation on all thirteen of the present television channels. It functions to select and amplify the desired picture and sound carriers, and converts to provide at the converter plate a picture i-f carrier of 25.75 mc and a sound i-f carrier of 21.25 mc.

R-F Amplifier—Referring to the Schematic Diagram (page 34), T1 is a center-tapped coil used to short circuit low-frequency signals picked up by the antenna. These signals would otherwise be applied directly to the control grids of the 6J6 r-f amplifier, V1. C1 and C2 are antenna-isolating capacitors. The d-c return for the grids of V1 is through R3 and R13, which also properly terminate the 300-ohm antenna transmission line. C3 and C4 are neutralizing capacitors necessary to counteract the grid-to-plate capacitance of the triode r-f amplifier.

In the plate circuit of the r-f amplifier are a series of inductances; L1 to L25 and L2 to L26 inclusive. These inductances may be considered as a quarter-wave section of balanced transmission line which can be tuned over a band of frequencies by moving a shorting bar along the parallel conductors. Adjustable coils L25 and L26 provide the correct length of line for the thirteenth channel, 210—216 mc. L13 to L23 and L14 to L24 are fixed sections of line which are added to L25 and L26 as the shorting bar is moved progressively down the line. The physical construction of each of these inductances is a small non-adjustable silver strap between the switch contacts. Each strap is cut to represent a six-megacycle change in frequency. In order to make the jump between the lowest high-frequency channel (174-180 mc) and the highest low-frequency channel (82-88 mc), adjustable coils L11 and L12 are inserted. To provide for the remaining five low-frequency channels, L1 to L9 and L2 to L10 are progressively switched in to add the necessary additional inductance.

Coils L1 to L9 and L2 to L10 are unusual in that they are wound in figure-8 fashion on fingers protruding from the switch wafer. This winding form produces a relatively non-critical coil since the coupling between turns is minimized. A maximum amount of wire is used for the small inductance which is required, thus permitting greater accuracy in manufacturing.

Converter—The converter grid line operates in a similar manner and is so arranged on the switch to provide coupling between it and the r-f line. C10, C12, C13, and a link provide additional coupling which is arranged to produce at least a 4-megacycle band pass on each of the channels.

L80 and C14 form a series-resonant circuit used to prevent i-f feedback in the converter by grounding its grids for i-f frequency. They also act as a trap to reject short-wave signals of intermediate frequency which arrive at the converter grid in a push-push manner.

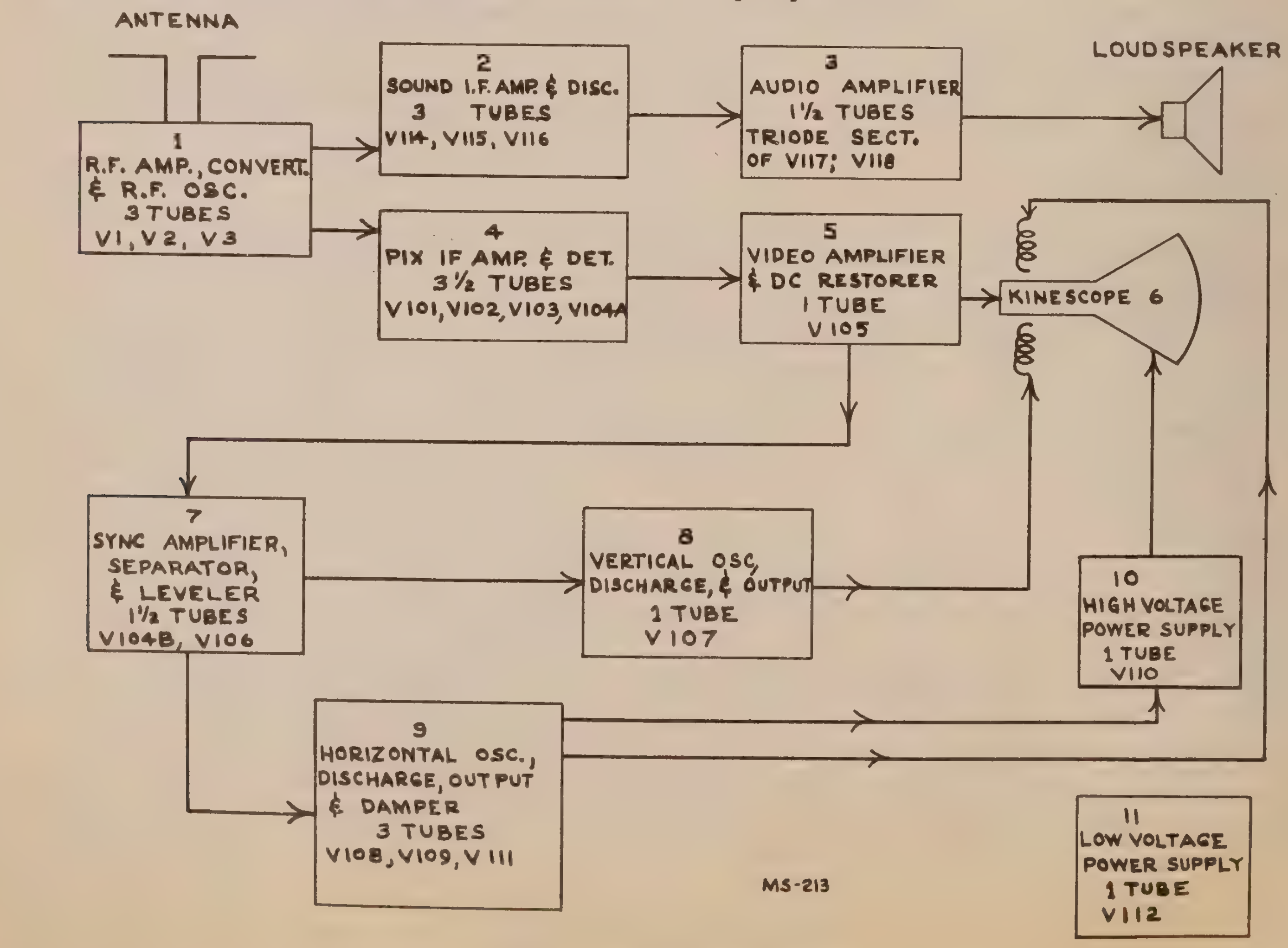
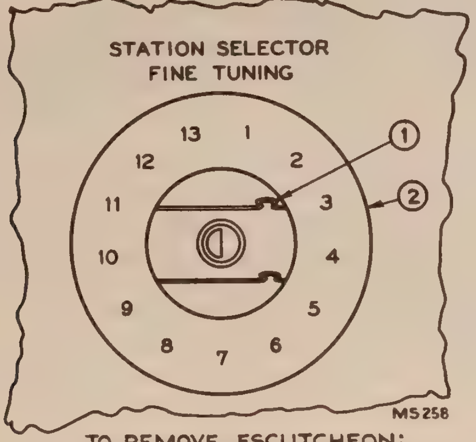

ANTENNA
2
SOUND I.F. AMP. & DISC.
3 TUBES
V114, V115, V116
3
AUDIO AMPLIFIER
1½ TUBES
TRIODE SECT. OF V117; V118
LOUDSPEAKER
1
R.F. AMP., CONVERT. & R.F. OSC.
3 TUBES
V1, V2, V3
4
PIX IF AMP. & DET.
3½ TUBES
V101, V102, V103, V104A
5
VIDEO AMPLIFIER & DC RESTORER
1 TUBE
V105
KINESCOPE 6
7
SYNC AMPLIFIER, SEPARATOR, & LEVELER
1½ TUBES
V104B, V106
8
VERTICAL OSC, DISCHARGE, & OUTPUT
1 TUBE
V107
10
HIGH VOLTAGE POWER SUPPLY
1 TUBE
V110
9
HORIZONTAL OSC., DISCHARGE, OUTPUT & DAMPER
3 TUBES
V108, V109, V111
11
LOW VOLTAGE POWER SUPPLY
1 TUBE
V112
MS-213

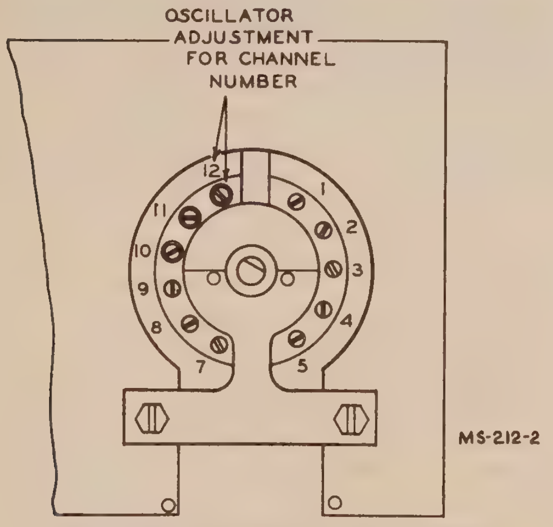
Figure 2—Functional Block Diagram

R-F Oscillator—The oscillator line is similar to the others except that an adjustment is provided for each channel and the low-frequency coils are not figure 8 windings. For tuning each channel, adjustable brass screws are placed in close proximity to the high-frequency tuning straps L66 to L76, and adjustable brass cores are provided for coils L54 to L62. These adjustments are accessible through the front panel of the cabinet when the station-selector escutcheon is removed. Field service adjustments of the r-f oscillator are thus possible on all channels except 6 and 13. If adjustments are necessary on these two channels, the chassis must be removed from the cabinet in order to gain access to the adjusting screws on L63, L64, L77 and L78. The high-frequency adjustments should be made before each lower-frequency adjustment.



TO REMOVE ESCUTCHEON:
1. SLIDE SPRING CLIP TO LEFT.
2. PULL ESCUTCHEON FORWARD AT RIGHT EDGE.

Figure 3—Removal of Station Selector Escutcheon



OSCILLATOR ADJUSTMENTS FOR CHANNELS 6 &13 ARE ON SIDE OF RF UNIT

Figure 4—Front Chassis Oscillator Adjustments

C15 is a fine-tuning adjustment which provides plus or minus approximately 300 kc variation of oscillator frequency on channel 1 and plus or minus approximately 750 kc on channel 13. On a few early production units, slightly less range is available.

The location of the oscillator line with respect to the converter grid line is such as to provide some coupling to the converter grids. This coupling is augmented by the link shown on the schematic and provides a reasonably uniform oscillator voltage at the converter grids over the entire tuning range of the unit.

The converter transformer T2 is a combination picture i-f transformer, sound trap, and sound i-f transformer. The converter plate coil is assembled within the structure of a high-Q resonant circuit tuned to the sound i-f frequency. This high-Q circuit absorbs the sound i-f component from the primary. Thus on the T2 primary (from which the picture i-f is fed), the sound carrier is attenuated relative to the picture channel.

SOUND I-F AND DISCRIMINATOR (block No. 2)—A portion of the energy absorbed by the T2 trap circuit is fed to the first sound i-f amplifier. Two stages of amplification are used to provide adequate sensitivity. A conventional discriminator circuit is used to demodulate the signal. The discriminator band width is approximately 350 kc between peaks.

AUDIO AMPLIFIER AND SPEAKER (block No. 3)—The audio amplifier is a conventional system employing the high mu triode section of V117 (6AT6) and a 6K6-GT power output tube which feeds a 6 x 4-inch E.M. dynamic speaker.

PICTURE I-F AND DETECTOR (block No. 4)—The picture i-f amplifier departs considerably from the conventional coupled system. To obtain the necessary wide-band characteristic with adequate gain, three stages of i-f amplification are employed. The converter plate and each successive i-f amplifier utilize one tuned circuit each, and each is tuned to a different frequency. The effective Q of each coil is fixed by the shunt plate load or grid resistor so that the product of the total number of stages produces the desired response curve. Figure 5 shows the relative gains and selectivities of each coil and the approximate shape of the curve of the quadruple combination. This drawing does not take into consideration the effect of the sound traps.

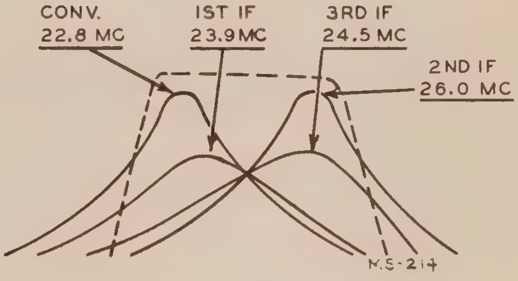


Figure 5—Relative Gains of I-F Transformers

In such a system variations of individual i-f amplifier tube gain do not affect the shape of the overall i-f response curve if the Q's and the center frequencies of the stages remain unchanged. This means that the i-f amplifier tubes are noncritical in replacement because variations in Gm do not affect response shape.

In i-f system alignment, the tuned circuits are peaked to certain specified frequencies with a signal generator. The overall i-f response is then observed with the use of a sweep generator and oscilloscope. Slight deviations from standard circuit Q are compensated for with slight shifts in tuned-circuit center frequency until the desired response curve is obtained. If this response cannot be obtained, the difficulty is likely to be in a component that affects either the frequency or the Q of one or more of the i-f coils.

The response curve does shift slightly as the picture control is varied due to Miller effect. This effect is the change in tube input capacitance as its gain is varied by grid-bias changes.

The change of input capacitance causes a slight detuning of the preceding i-f coil and a small shift in response-curve shape. This effect is slight, however, and when the receiver is aligned with the specified grid bias, no difficulty from this source should be encountered.

Figure 6 shows the relative positions of the picture and sound carriers for channels 2, 3 and 4. If a station on channel 3 is transmitting a picture with video frequencies up to 4 mc, the picture carrier will have upper side band frequencies up to 65.25 mc. The lower side bands are suppressed at the transmitter.

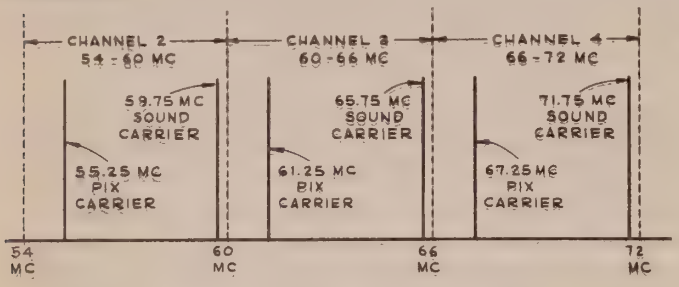


Figure 6—Channel Allocations

With the receiver r-f oscillator operating at a higher frequency than the received carrier, the intermediate frequency relation of picture to sound carrier is reversed as shown in Figure 7.

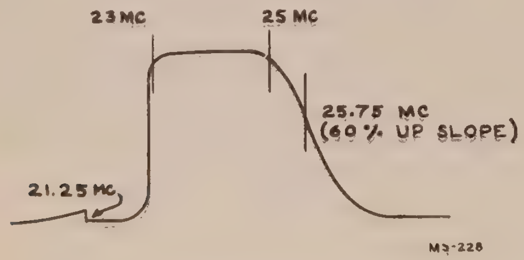


Figure 7—Typical Overall Response Curve

The curve shown is typical of the picture i-f amplifier response. In order to obtain this band-pass characteristic, the picture i-f coils are tuned as follows:

Converter transformer	22.8 mc (T2 primary)
First pix i-f coil	23.9 mc (L101)
Second pix i-f coil	26.0 mc (L102)
Third pix i-f coil	24.5 mc (L103)

Traps—Since it is necessary for the picture i-f amplifier to pass frequencies quite close to the sound carrier frequency, the sound carrier would produce interference in the picture. In order to prevent this interference, traps must be added to the picture i-f amplifier to attenuate the sound carrier. Two traps are provided in the receiver for this purpose.

The first trap (T2 secondary), located on the r-f unit, is an absorption circuit which is tuned to the accompanying sound channel frequency of 21.25 mc. The second trap (T101) is a cathode-coupled circuit, located in the cathode return of the third picture i-f tube V103. The coil in series with the cathode bypass capacitor C110 forms a series-resonant circuit at the frequency to which the plate coil L102 of V102 is tuned (26.0 mc). This provides a low impedance in the cathode circuit of V103 at this frequency and permits the tube to operate at a gain. However, at the resonant frequency (21.25 mc) of the secondary of T101, tuned by C109 and the adjustable core, a high impedance is reflected into the cathode circuit. Thus, the gain of the tube at this frequency, (21.25 mc) is reduced by degeneration. The rejection at 21.25 mc with this circuit is limited to the gain of the tube.

No adjacent channel sound or picture traps are provided in this receiver.

Picture Second Detector—The detector is a conventional half-wave rectifier connected to produce a video signal of the proper polarity. One section of a 6H6 dual-diode tube (V104A) is used for this purpose.

Picture Control—The picture (or contrast) control (R108) varies the bias on the r-f amplifier and the first and second i-f amplifier control grids. It is, in effect, a manual sensitivity control operated to provide the correct video output level from the second detector.

VIDEO AMPLIFIER AND D-C RESTORER (block No. 5)—The function of this section of the receiver is to amplify the video output of the second detector. Two amplifier stages are employed by using a 6SN7-GT dual-triode tube. Peaking coils are used in the picture detector output and in the last video amplifier plate circuit in order to overcome the circuit and tube capacity effects which tend to reduce the gain of each stage at the higher frequencies. Peaking also provides a sharp cut-off at the high end of the pass band. The gain from the first video grid to output plate is 20X and the frequency response extends to 3 mc.

Interference Saturation Circuit—Since the synchronizing pulse is "blacker than black" and "black" information must drive the Kinescope grid toward cutoff, the video signal polarity must be such that the sync is negative when applied to the Kinescope grid. It is therefore obvious that for the two-stage video amplifier used, the sync pulse from the second detector must also be negative at the first video amplifier grid. The first stage is designed so that with a normal signal input level at its grid, the tube will be working over most of its operating range. Then any large interference signal above sync will drive the grid to cutoff and the interference will be limited. The signal to interference ratio is thus effectively improved.

D-C Restorer—Since the video amplifier is an a-c amplifier, the d-c component of the video signal that represents the average illumination of the original scene will not be passed. Unless this d-c component is restored, difficulty will be experienced in maintaining proper scene illumination. For any given scene, this average illumination could be set properly by the brightness control. However, a change of scene would probably necessitate resetting this control.

The d-c restorer accomplishes this setting automatically by providing a bias on the kinescope grid that varies with the scene. This variable bias is obtained in the second video stage grid circuit. Each horizontal sync pulse in the composite video signal is in a positive direction as applied to the second video grid and will cause grid current to flow, charging capacitor C115 to approximately the peak value of the pulse. This capacitor, of course, discharges slightly between pulses, the discharge rate being controlled by the value of the grid resistor R121 (1 meg.). Consequently the voltage across C115 varies with the amplitude of the pulses, thus providing the required bias change. With this method of restoring the d-c component, it is necessary that the plate of the video amplifier tube be conductively coupled to the grid of the Kinescope. For a more detailed explanation of the operation of the d-c restorer, see "Practical Television by RCA."

KINESCOPE (block No. 6)—The Kinescope is a 7" tube employing a new type screen material which provides considerably improved picture brilliance. The tube employs magnetic deflection and electrostatic focus. An ion trap magnet is employed to prevent the ion beam from producing a brown spot on the picture screen.

The inside and outside of the flaring portion of the bulb are given a metallic coating. The inner coating, which is the second anode, is connected to the high-voltage supply. The outer coating is grounded by means of two small springs on the deflection yoke support. The capacity between the two coatings is used as a high voltage filter capacitor.

SYNC AMPLIFIER, SEPARATOR AND LEVELER (block No. 7)—The functions of this system are (1) to amplify the video and synchronizing signal obtained from R125 in the second video stage (V105) plate circuit; (2) to separate the sync pulses from the video signal; (3) to level the pulses before they are applied to the vertical and horizontal sweep oscillators. The pulses are used to trigger these oscillators so that the Kinescope deflection voltages are synchronized with the transmitted signal.

Sync Amplifier (First section of 6SN7-GT, V106)—The first section of V106 is a normal voltage amplifier. Its output is the combined video and sync signal and is applied to the grid of the second section of V106 with the sync peaks in the "positive" direction.

Sync Separator (Second section of V106) and **Sync Leveler** (V104B, second section of 6H6)—The operating voltages applied to the grid and plate of the sync separator section of V106, plus a negative bias obtained from the diode V104B, cause the negative portion of the applied signal to be cut off. Thus, the video and blanking pulse information is removed from the signal appearing at the cathode of the sync separator. The diode (V104B) also levels the line of sync so that each recurring pulse is at a common amplitude.

The sync signal is taken from the cathode because a low-impedance output is obtained (about 200 ohms). This low-impedance output is advantageous since the deflection pulses will not feed back through the tube capacities so readily as would be the case when a triode is used having a plate load for output. The cathode load resistors are R132 and R133 and the sync signal applied to the vertical integrating network is taken from across both resistors. The sync signal applied to the horizontal oscillator (V108) is taken from across R133 only.

Integrating Network—The purpose of this network is to separate the horizontal sync from the vertical sync and to pass the vertical sync pulses to the vertical oscillator.

Since the horizontal sync pulse is of short duration (5 microseconds) and the vertical pulse is of much longer duration (190 microseconds), they can be separated by an r-c filter that is responsive to wave shape. The integrating network, which is such a filter, is composed of R136, R137, R138, C123, C124, and C125. In operation the network can be considered to be a low-pass filter which by-passes the narrow or high-frequency horizontal sync, but which passes the broad or low-frequency vertical sync.

VERTICAL OSCILLATOR, DISCHARGE, AND OUTPUT (block No. 8)—The function of these circuits is to provide a sawtooth of current of the proper frequency to perform the vertical scanning for the Kinescope. To produce such a current in the vertical deflection coil, a somewhat differently shaped voltage wave is required.

Since the vertical trace is slow, requiring 16,000 microseconds, and the vertical deflection coil inductance is small (50 millihenries), the majority of the voltage across the coil during trace is across its resistive component. In order to produce a linear change of current through a resistance, a linear change of voltage is necessary. Retrace, however, must be accomplished within 666 microseconds and therefore requires a much faster rate of change of current through the coil. During this time, the effect of the inductance of the coil becomes appreciable because of the required fast rate of change of current and so a large pulse of voltage must be applied in order to obtain rapid retrace. The composite waveform required to produce a sawtooth of current in the coil is a sawtooth of voltage with a sharp pulse. The 6SN7-GT tube (V107) provides such a voltage.

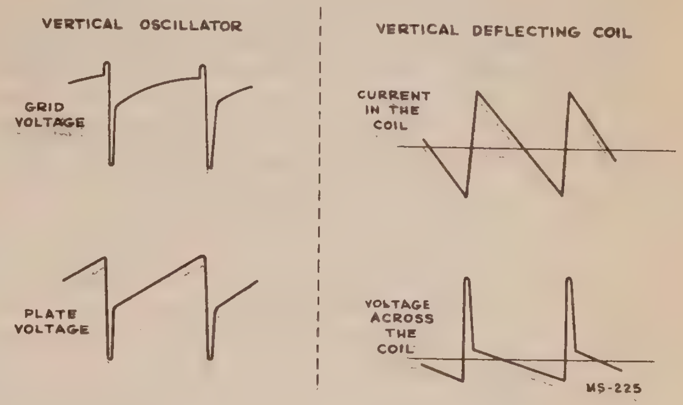


Figure 8—Vertical Sweep Waveforms

Vertical Oscillator and Discharge—The first section of the 6SN7-GT dual triode tube V107, with its associated components, forms a blocking oscillator and discharge circuit. In the absence of the sync pulse input, this oscillator operates at a frequency determined by C126, R143, and R144; R144 (vertical hold control) varies its "free running" frequency. For picture reception, R144 is adjusted so that the free-running period is just slightly longer than the time between standard sync pulses.

In its free-running condition, the wave form of the voltage at the control grid (1) of the tube is a small, positive surge followed by a large negative drop which returns to the positive condition at a relatively slow rate. The positive surge, or pulse, takes about 5% of the time required for the complete cycle.

During the negative part of the cycle, the grid is beyond cut-off and the discharge capacitor, C130, charges through resistors R139, R141, R142 and R149. When the grid reaches a voltage that permits plate to cathode conduction, C130 discharges through T102 secondary, R149, and the tube. The discharge current of C130 builds up a magnetic field in T102 that in turn induces a positive voltage at the grid (1) of the tube. This positive voltage on the grid lowers the plate resistance of the tube which allows C130 to discharge more rapidly. This process builds up very quickly until C130 is nearly discharged. The magnetic field in T102 then collapses and drives the grid negative. The charge placed on C126 due to grid conduction during the positive pulse now holds the grid negative. As the charge on C126 leaks off through R143, R144, etc., the grid slowly becomes less negative and will eventually reach the point that again permits plate to cathode conduction. This process is repeated in the absence of the incoming sync pulse.

During picture reception, the 60 cycle vertical synchronizing pulse from the integrating network is applied to the grid of the vertical oscillator tube. This incoming sync pulse reaches the grid just before the tube would "trip" in its free running cycle. The magnitude of the sync pulse is sufficient to drive the tube to conduction. Thus, the incoming sync trips the oscillator just slightly before it would have tripped itself and in this manner the incoming sync maintains control of vertical scanning. As previously mentioned, the vertical hold control (R144) is adjusted so that the free-running period is just slightly longer than the time between vertical sync pulses.

On the plate (2) of V107, a sawtooth of voltage appears due to the slow charging and rapid discharging of C130. A sharp negative pulse also occurs during the discharge period. (See Figure 8.) This pulse appears because of the peaking action of R149 and C130. When the tube is conducting, the plate voltage drops almost to cathode potential. C130 discharges during this time. However, since the conduction time is short, C130 cannot be completely discharged due to the time constant of R149 in series with C130. Then when the tube becomes non-conducting, the plate voltage does not have to rise slowly from cathode potential but instead rises immediately to an appreciable value due to the charge that remains on C130. The plate voltage then slowly rises from this value as C130 charges through R139, R141, R142, and R149. Adjustment of the height control R141 varies the amplitude of the sawtooth voltage on the plate by controlling the rate at which C130 can charge.

The voltage present on the plate (2) is of the basic shape required to produce a sawtooth of current in the vertical deflection coil; however, it must be amplified in order to produce the required amount of power.

Vertical Output—The second section of the 6SN7-GT tube (V107) is used for the vertical output stage. The vertical output transformer T103 matches the impedance of the vertical deflection coils to the plate impedance of the tube.

R148 is provided as a linearity control. The grid-voltage plate-current curve of this tube is not a straight line over its entire range; therefore the effect of adjustments of R148 is to produce variations in shape of the sawtooth by shifting the operating point of the tube to different points along the curve. Since the slope of the curve varies at these different points and thus varies the effective gain of the tube, adjustments of linearity affect picture height and such adjustments must be accompanied by readjustments of the height control R141. Adjustments of the height control affect the shape of the sawtooth voltage on the plate (2) of the oscillator section of this tube so that adjustments of height must be accompanied by readjustments of linearity.

HORIZONTAL OSCILLATOR, DISCHARGE, OUTPUT, AND DAMPER (block No. 9)—The purpose of these circuits is to produce the sawtooth of current in the deflection coils necessary to provide horizontal scanning for the Kinescope.

Horizontal Oscillator and Discharge—The proper waveform is generated by the 6SN7-GT tube V108 and its associated components. The operation is similar to that in the vertical circuits described above except that the first section of the tube is used as the oscillator and the second section as the discharge circuit that produces the sawtooth waveform necessary for horizontal deflection of the Kinescope beam.

In the absence of the sync pulse input, the oscillator section of the tube operates at a frequency determined by C133, R155, R156, and R158. The free-running frequency is controlled by the setting of R156 (horizontal hold control). As the grids of both sections are connected together, the grid (4) of the discharge section becomes positive simultaneously with the oscillator grid and both sections conduct in unison.

During picture reception, the horizontal synchronizing pulse obtained from across R133 in the cathode circuit of the sync separator section of V106 is of sufficient magnitude to trip the oscillator before capacitor C133 in the oscillator grid circuit has discharged through R155, R156, and R158 to a value that permits the tube to conduct in its free-running state. Thus, as in the vertical circuits, the synchronizing pulse maintains control of the oscillator frequency when the horizontal hold control (R156) is adjusted so that the free-running time is slightly longer than the time between the horizontal sync pulses.

The discharge section of V109 produces the required sawtooth due to the slow charging and rapid discharging of capacitor C136. During the time of the prolonged negative portion of the oscillator pulse, when the tube is not conducting, C136 charges through R159, C135, R161 (horizontal drive control), and R188. During the short conduction period of the tube, the capacitor is discharged.

The peaking action described in the vertical discharge description is obtained by R161 (horizontal drive control) and R188 in conjunction with C136.

Horizontal Output and Damper—The operation of these two circuits is so interconnected that they must necessarily be discussed simultaneously. The function of the output tube V109 is to supply sufficient current of the proper wave form to the horizontal deflection coils in order to provide horizontal scanning for the Kinescope. The function of the damper tube V111 is to stop oscillation of certain components at certain times and thus help provide a linear trace. Other functions of these circuits include the utilization of energy stored in the horizontal deflection coil to furnish retrace and Kinescope high voltage. The damper circuit also recovers some of the energy from the yoke kick-back and uses it to help supply the plate power requirements of the output tube.

In operation, the visible portion of the horizontal trace is approximately 53 microseconds in duration. Although the inductance of the horizontal deflection coil is in the order of only 8 millihenries, the reactance of the coil predominates over the coil's resistance at the horizontal scanning frequency. This is a different case than that encountered in the vertical deflection system and so a different method of operation must be employed.

Horizontal blanking is approximately 10 microseconds in duration. During this time, the Kinescope beam must be returned to the left side of the tube, and the trace must be started and made linear. To accomplish all this within the horizontal blanking time, only 7 microseconds can be allowed for the return trace. In order to obtain such rapid retrace, the horizontal deflection coil, output transformer, and associated circuits are designed to resonate at a frequency such that one half-cycle of oscillation at this frequency will occur in the 7 microseconds retrace time limit. This represents a frequency of approximately 71 kc.

During the latter part of the horizontal trace, the output tube conducts very heavily and builds up a strong magnetic field in the deflection coil and in the output transformer. When the negative pulse from the horizontal oscillator (V108) is applied to the output tube grid, its plate current is suddenly cut off and the magnetic field in the transformer and in the deflection coil begins to collapse at a rate determined by the resonant frequency of the system. Actually the system is shock excited into oscillation. Since the output tube is cut off and since the voltage generated by the collapsing field is negative on the damper tube plate so that it is non-conductive, there is essentially no load on the circuit and it oscillates vigorously for one half-cycle. If the damper tube were not present, the circuit would continue to oscillate as shown in Figure 9, A. This condition however is not permitted. One half-cycle of oscillation is permitted because at the end of such time the current in the deflection coil has reached a maximum in the opposite direction to which it was flowing at the end of the trace period. This reversal of current flow is the requirement for retrace and it is accomplished in the allotted 7 microseconds.

Now that retrace has been completed, the next trace must be started. The energy which was placed in the deflection coil by the output tube in the latter part of the last trace has not been dissipated. During the half-cycle of oscillation retrace was accomplished with very little loss of energy. The field in the coil was merely reversed in polarity. So, at this point, a strong field exists in the deflection coil.

As mentioned previously, if the coil were not damped, it would continue to oscillate at its natural frequency. To prevent this oscillation the damper tube is brought into action. This tube is in a modified damper circuit which is effectively connected across the deflecting coil.

In the oscillating circuit, the current in the deflection coil lags the voltage by approximately 90 degrees (considering 90 degrees as one-quarter cycle of oscillation frequency; i.e., 71 kc) and when the current has reached its maximum negative value, the voltage across the coil, being 90 degrees ahead, has begun to swing positive. When the voltage on the damper tube plate becomes positive with respect to its cathode, the tube begins to conduct heavily. This places such a load across the deflection coil that it cannot oscillate. Instead, the field begins to decay at a rate permitted by the load which the damper tube places on the coil. The circuit constants are such that this decay is linear and at a rate suitable for the visible trace.

If no additional energy were fed into the coil, the field would fall to zero and the Kinescope beam would come to rest in the center of the tube. In such an r-l circuit, as the current approaches its final value, it does not do so linearly but asymptotically as indicated in Figure 9, B. The output tube must therefore begin to supply power to the deflection coil before the energy in the coil is completely dissipated. Figure 9, C shows the curve of the current supplied by the output tube. Although the currents supplied by the output tube and by the decaying field are curved at the cross over point, together they produce a yoke current that is linear. By the time the beam has reached the right side of the Kinescope, the output tube is conducting heavily and has built up a strong field in the transformer and in the coil. At this point, the output tube is again suddenly cut off and the process is repeated.

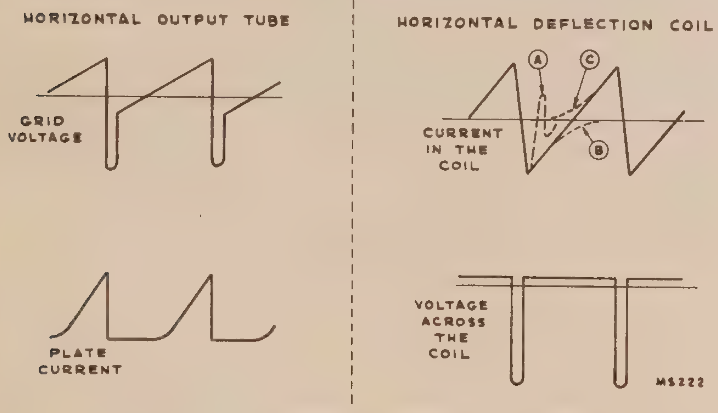


Figure 9—Horizontal Sweep Waveforms

The 6BG6-G plate voltage is supplied through the 5V4-G damper tube, which is conducting over the major portion of the trace. Capacitors C139 and C140 are charged during this period and this charge is sufficient to supply the 6BG6-G plate when the 5V4-G is not conducting.

The charge is placed on these capacitors by the receiver d-c supply and by the current produced by the collapse of the field in the horizontal deflecting coil. The a-c axis of the sweep voltage is approximately 235 volts above ground since the secondary of T105 is connected to the receiver power supply ahead of the centering controls in the +B circuit. The charge placed on the capacitors by the coil kick-back is therefore in addition to that from the d-c supply and thus the capacitors are charged to a voltage greater than the d-c supply. This permits operation of the 6BG6-G at a higher voltage than is obtainable from the receiver power supply and produces an increase in the system efficiency by salvaging energy that would otherwise have been wasted. Plate voltage for the vertical oscillator tube (V107A) and for the horizontal discharge tube (V108B) is also obtained from this source.

Linearity Control—During the trace period, the voltage across L113 varies due to the changing plate current in the horizontal output tube. This varying voltage constitutes an a-c "ripple" on the cathode of the damper tube. L113 and C139 constitute a phase shifting network. By shifting the phase of this ripple, slight variations of linearity are obtained. L113, the horizontal linearity control, is variable and is provided to effect these improvements in linearity. Counterclockwise rotation of the adjustment screw causes the middle of the picture to stretch and the ends to crowd.

Horizontal Drive Control—R161, the horizontal drive control, determines the ratio of peaking to saw-tooth voltage on the grid of the horizontal output tube and thus affects the point on the trace where the tube conducts. Clockwise rotation of the control increases picture width and stretches the left side.

Width Control—L112, the width control, is provided to vary the output and hence the picture width by shunting a portion of the T105 secondary winding. Clockwise rotation of the adjustment increases the picture width and causes the right side of the picture to stretch slightly.

Linearity Adjustment—R165 is a damping resistor inserted to control trace linearity on the left side of the picture. Taps are provided on this resistor by which variations in the yoke and in the output transformer can be compensated for. The proper tap is selected in the factory and probably will not have to be changed in the field.

HIGH-VOLTAGE POWER SUPPLY (block No. 10)—The high-voltage power supply is unusual in that the power is supplied from the energy stored in the deflection inductances during each horizontal scan. When the 6BG6-G plate current is cut off by the incoming signal, a positive pulse appears on the T105 primary due to the collapsing field in the horizontal yoke. This pulse of voltage is stepped up, rectified, filtered and applied to the second anode of the Kinescope. Since the frequency of the supply voltage is high, (15,750 cps), relatively little filter capacity is necessary. Since the filter capacity is small, the stored energy is small, and the high voltage supply is made less dangerous. The filter capacitors are C142 and the capacitor formed by the inner and outer coatings on the Kinescope.

LOW VOLTAGE POWER SUPPLY (block No. 11)—The low voltage power supply provides the filament and plate voltages for the receiver. The unit is conventional, and employs a 5U4-G rectifier tube to supply 325 volts d-c at approximately 225 ma. The speaker field is used as the filter choke.

INSTALLATION INSTRUCTIONS

RECEIVER LOCATION—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION—The receiver is provided with adequate ventilation holes in the bottom, back, top, and sides of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

RECEIVER SUPPORT CAUTION—The complete receiver weighs approximately 60 pounds. This represents a considerably greater load than can usually be placed on the average small table. Only a very sturdy table should be used to support the receiver.

Due to the weight of the receiver, the cabinet should not be dragged or slid across the supporting table as damage to the table finish may result.

ANTENNAS—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and to use care in its installation.

RCA Television Antennas, stock No. 225 and No. 226, are designed for reception on all thirteen television channels. These antennas use the 300-ohm RCA "Bright Picture" television transmission line. Installation personnel are cautioned not to make any changes in the antenna or to substitute other types of transmission line as such changes may result in unsatisfactory picture reproduction.

The stock No. 226 antenna is bi-directional on channels one through six (44 to 88 Mc). When used on these channels, the maximum signal is obtained when the antenna rods are broadside to the transmitting antenna.

The stock No. 225 antenna with reflector is uni-directional on channels one through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside to the transmitting antenna, with the antenna element between the reflector and the transmitting antenna.

When operated on channels seven through thirteen, (174 to 216 Mc), both types of antennas have side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from a position broadside to the transmitting antenna.

In general, the stock No. 225 antenna should be used if reflections are encountered, if the signal strength is weak, or if the receiving location is noisy. If these conditions are not encountered, the stock No. 226 antenna will probably be satisfactory.

In most cases, the antenna should not be installed permanently until the quality of the picture reception has been observed on a television receiver. A temporary transmission line can be run between the receiver and the antenna, with sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver with an assistant at the antenna, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of direction or of a few feet in antenna position may effect a considerable difference in picture reception.

REFLECTIONS—If reflections are encountered, it may be possible to eliminate them by rotation of the antenna.

Occasionally reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so that it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions. Wet surfaces have been known to have different reflecting characteristics than dry surfaces.

INTERFERENCE—Auto ignition, street cars, electrical machinery, and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices, and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters, or other metal objects.

LIGHTNING ARRESTOR—The lightning arrestor contained in the antenna kit should be installed in accordance with the instructions. The mast used to mount the antenna should be provided with a direct ground.

INFORMATION REFERENCES—In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals. For further information on antennas and antenna installation see the RCA Booklet entitled "Practical Television by RCA," and also the specific instructions accompanying the RCA Television Antenna.

RECEIVER HANDLING PRECAUTION—The 621TS Receiver weighs approximately 60 pounds and therefore should always be picked up by the bottom of the cabinet since lifting by the top might tend to strain the cabinet structure.

SETTING UP RECEIVER—The receiver is shipped with all tubes in their sockets except the 7DP4 Kinescope. The Kinescope is shipped in a special carton and should not be unpacked until ready for installation.

Remove the front panel of the receiver cabinet as indicated in Figure 10, and then the perforated metal back cover.

TO REMOVE FRONT PANEL:-

1 REMOVE COVER PLATES BY SLIDING SIDEWAYS

2 REMOVE SCREWS AND BRACKETS

3 PULL PANEL AND SAFETY GLASS FORWARD

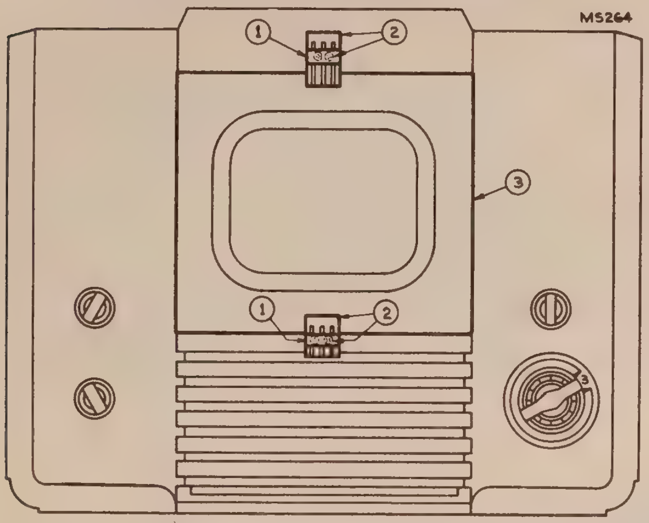


Figure 10—Removal of Cabinet Front Panel

Remove the protective cardboard from the 5U4-G rectifier tube.

Make sure that all tubes are in place and firmly seated in their sockets.

Loosen the two Kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis.

Loosen the deflection yoke adjustment and slide the yoke toward the rear of the chassis.

(See Figure 11 for the location of the cushion and yoke adjustments).

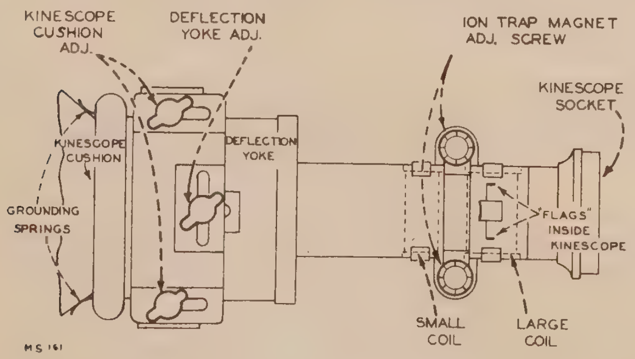


Figure 11—Cushion, Yoke, and Ion Trap Magnet Adjustments

Loosen the two lower Kinescope face centering supports, and set them at approximately mid-position. See Figure 12 for location of the supports and their adjustment screws.

Loosen the ion trap magnet adjustment thumb screws.

KINESCOPE HANDLING PRECAUTION—Do not open the Kinescope shipping carton, install, remove, or handle the Kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the Kinescope. Keep the Kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE—The Kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The finial orientation of the tube will be determined by the position of the Kinescope flags. Looking at the Kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags. The Kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 11.

Insert the neck of the Kinescope into the cabinet and through the deflection yoke as shown in Figure 12. Before the tube is fully inserted in the cabinet, attach the second anode connector. This is the red lead that terminates in a connector and rubber suction cup.

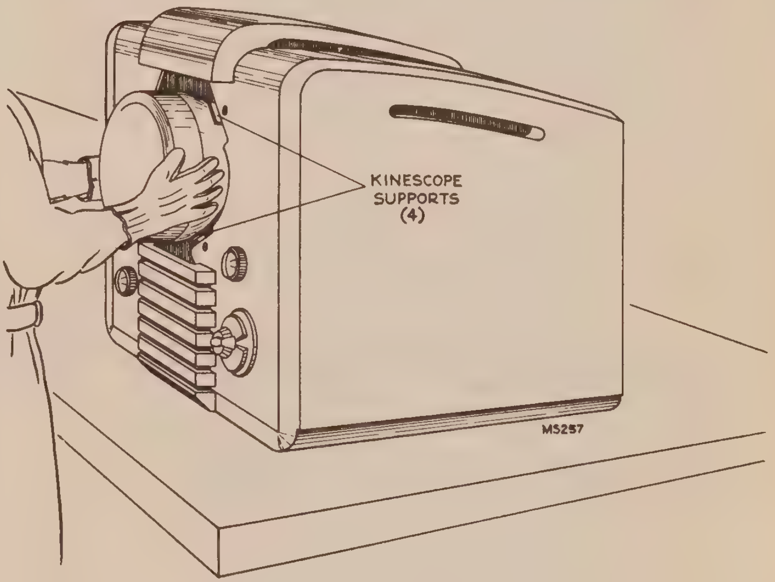


Figure 12—Kinescope Installation

Slip the ion trap magnet with its coils on the neck of the Kinescope with the large coil toward the base of the tube as shown in Figure 11.

Connect the Kinescope socket to the tube base.

Adjust the four Kinescope supports until the face of the Kinescope is in the center of the cabinet opening. Partially tighten the support screws.

Place the front panel temporarily on the cabinet to check the Kinescope centering for proper masking. Readjust the supports as required.

Wipe the Kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with "Windex" or similar cleaning agent.

Install the cabinet front in reverse procedure as indicated in Figure 10.

Slip the Kinescope as far forward as possible.

Slide the Kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws.

Slide the deflection yoke as far forward as possible and tighten its wing screw.

Attach the knobs to their respective shafts.

The antenna and power connections should now be made.

Turn the power switch to the "on" position, the brightness control fully clockwise, and the picture control counter-clockwise.

ION TRAP MAGNET AND FOCUS ADJUSTMENT—The ion trap rear magnet poles should be approximately over the Kinescope flags as shown in Figure 11. Starting from this position adjust the ion trap magnet by moving it forward, at the same time rotating it slightly around the neck of the Kinescope for the brightest raster on the screen.

If a corner of the raster is shadowed, this indicates that the electron beam is striking the neck of the tube. Rotate the ion trap magnet until the entire raster is visible, approximately centered, and with no shadowed corners.

Tighten the ion trap magnet adjustment thumbscrews sufficiently to hold the trap magnet in this position but still free enough to permit further adjustment of the trap magnet.

Reduce the brightness control setting until the raster is slightly above average brilliance.

Adjust the focus control (R171 on the chassis rear apron) until the line structure of the raster is clearly visible.

Readjust the ion trap magnet for maximum raster brilliance and best focus.

The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

Tighten the ion trap magnet adjustment thumb screws.

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, loosen the yoke adjustment wing screw and rotate the deflection yoke until this condition is obtained. Tighten the wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 9 of the receiver operating instructions on page 3.

The effects of improper adjustment of the operating controls, and some conditions of reception are shown in Figures 14 to 21 inclusive on page 13.

The following chassis rear apron adjustments may now be necessary. The effects of improper adjustment of these controls are shown in Figures 22 to 29 inclusive, page 14.

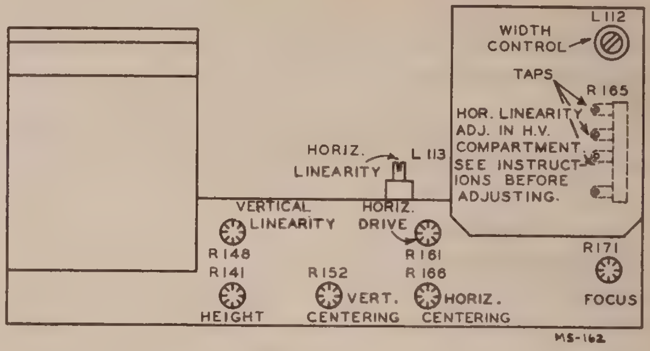


Figure 13—Rear Chassis Adjustments

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R141 on chassis rear apron) until the picture fills the mask vertically (4¼ inches). Adjust the vertical linearity control (R148 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust the vertical centering control (R152 on rear apron) so that the pattern is centered vertically.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive control (R161 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage for the Kinescope second anode. Adjust the width control (L112 on rear chassis) until the test pattern just fills the mask horizontally (5⅝ inches). Adjust the horizontal linearity control L113 (see Figure 13) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust the horizontal centering control (R166 on rear apron) so that the pattern is centered horizontally.

If repeated adjustments of drive, width, and linearity fail to give proper linearity, it may be necessary to move the tap on R165, which is located in the high voltage compartment. Adjustments of drive, width, and linearity must then be repeated.

Check to see that all cushion, yoke, and ion trap magnet thumb screws are tight. Replace the cabinet back. The receiver may now be put into operation.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal-calibrated test oscillator, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels when the fine-tuning control is approximately in the center of its range. If not, it must be adjusted by the method outlined on page 23.

Tune in all available Television Stations. Observe the picture for detail, for proper interlacing, and for the presence of reflections. If reflections are encountered, see the section on antennas on page 10.

TEST PATTERN PHOTOGRAPHS

Effects of Improper Adjustment of Operating Controls, and Some Conditions of Reception.

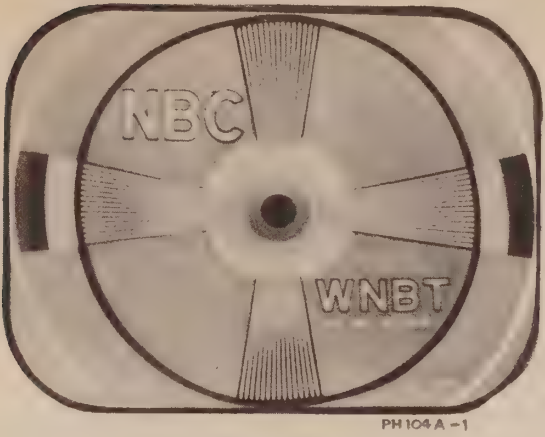

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Figure 14—Normal Picture

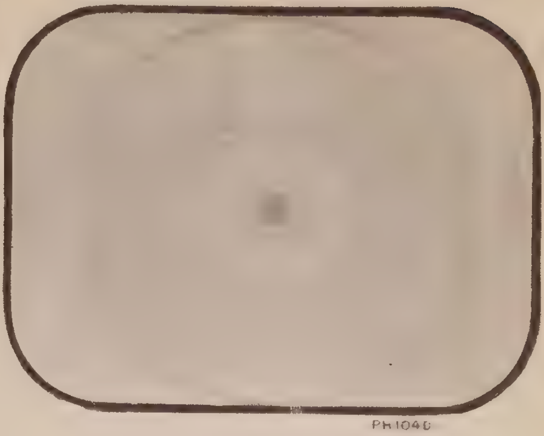
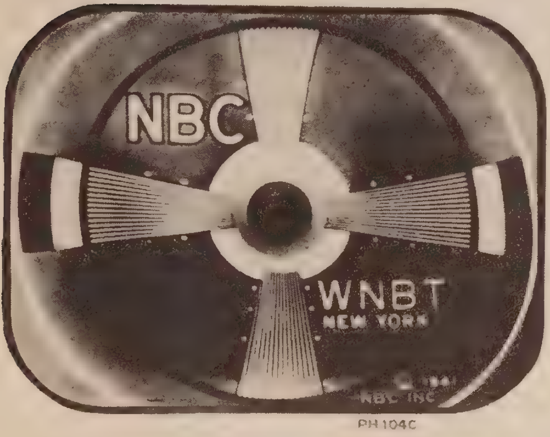


Figure 15—Brightness Control Misadjusted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NBC INC
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Figure 16—Picture Control Misadjusted

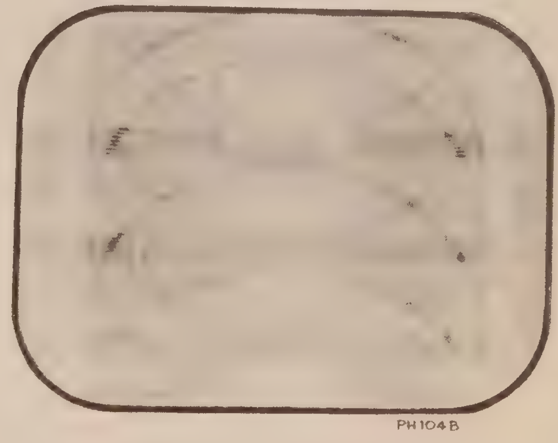

Figure 17—Vertical Control Misadjusted

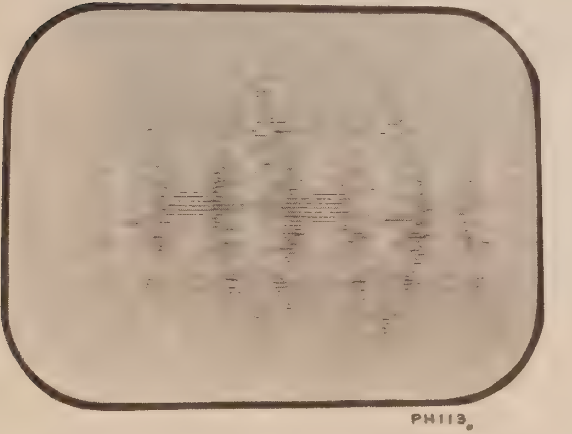

Figure 18—Horizontal Control Misadjusted

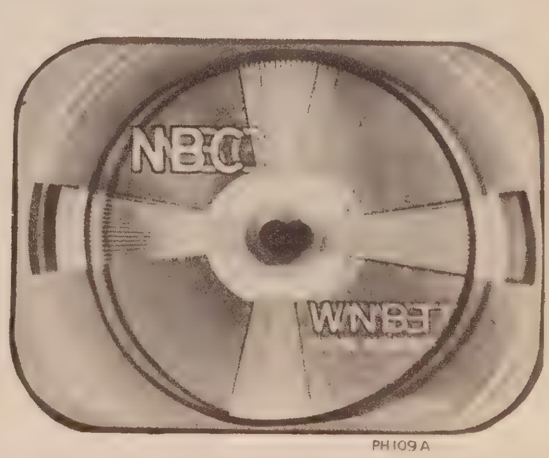
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Figure 19—Reflections

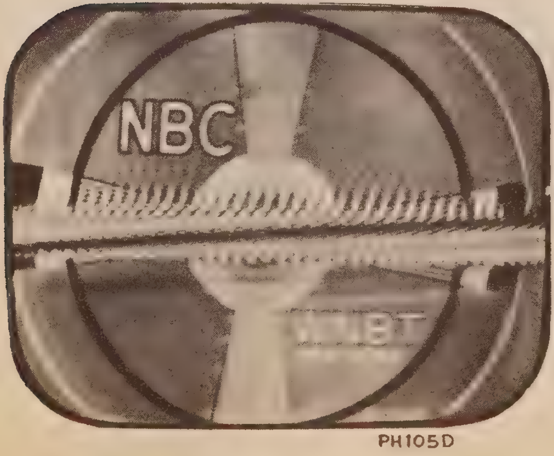
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Figure 20—Diathermy Interference

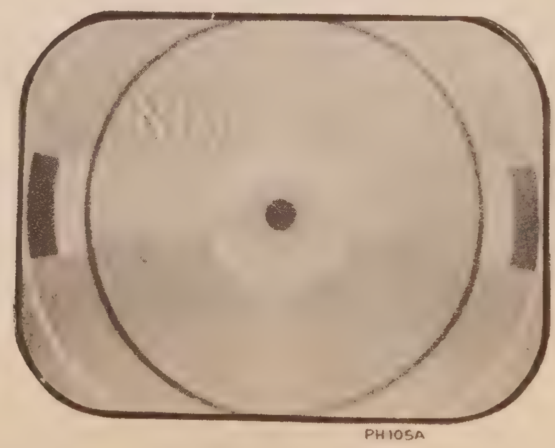

Figure 21—Weak Signal

TEST PATTERN PHOTOGRAPHS

Effects of Improper Adjustment of Rear Chassis Controls.

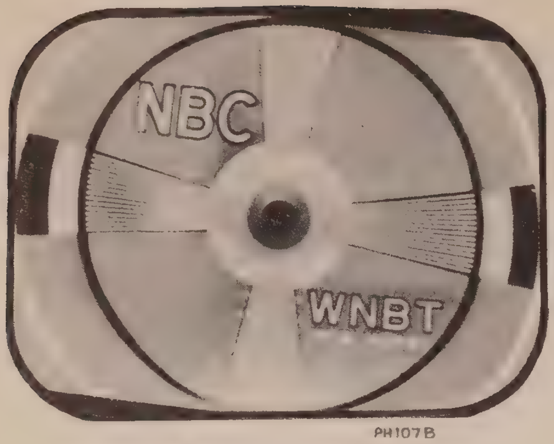
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Figure 22—Deflection Yoke Rotated

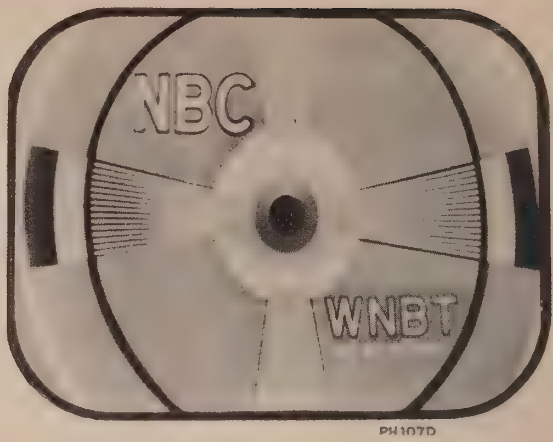
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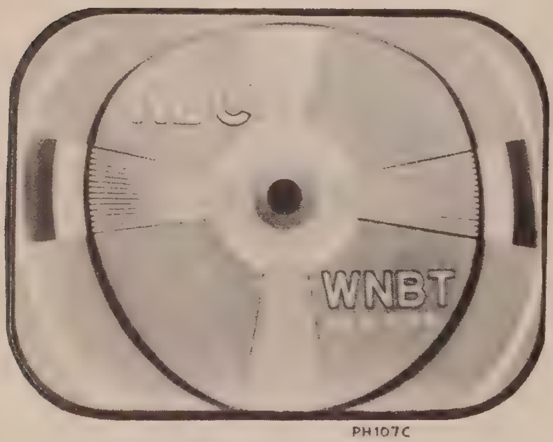
Figure 23—Height Control Misadjusted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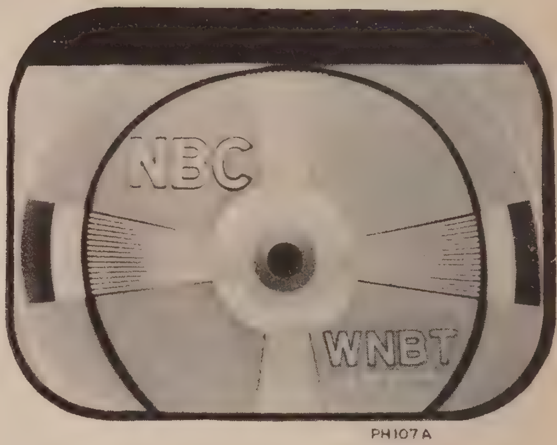
PH107C

Figure 24—Vertical Linearity Control Misadjusted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PH107A

Figure 25—Vertical Centering Control Misadjusted

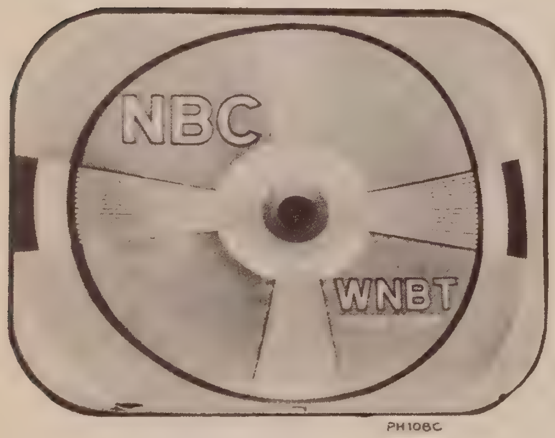

NBC
WNBT
PH108C

Figure 26—Horizontal Drive Control Misadjusted

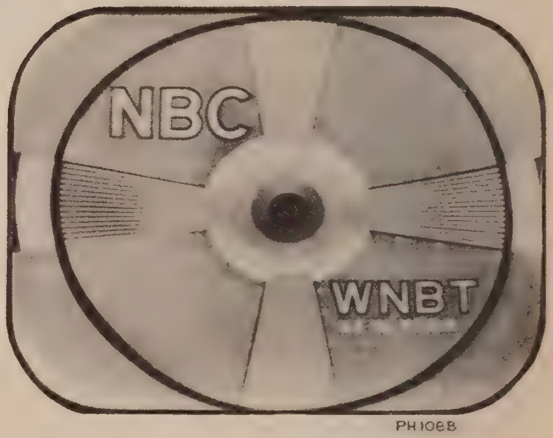

NBC
WNBT
PH106B

Figure 27—Width Control Misadjusted

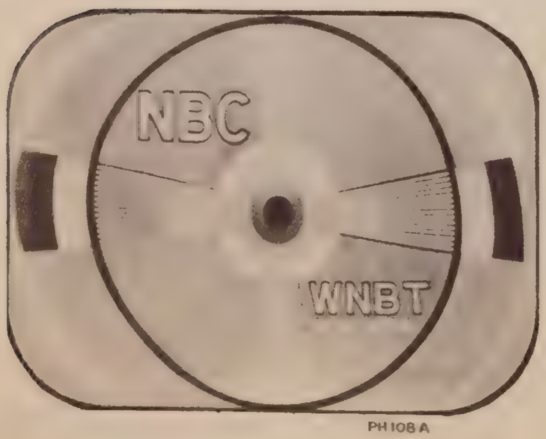

NBC
WNBT
PH108A

Figure 28—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

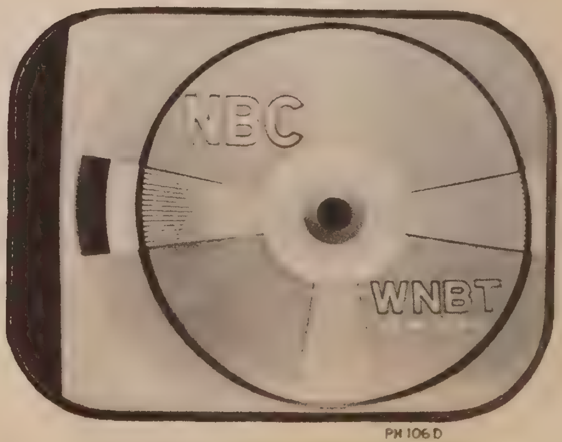

NBC
WNBT
PH106D

Figure 29—Horizontal Centering Control Misadjusted

ALIGNMENT PROCEDURE

TEST EQUIPMENT—To service this receiver properly, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges:

18 to 30 mc, 1 mc sweep width
40 to 90 mc, 10 mc sweep width
170 to 225 mc, 10 mc sweep width

(b) Output adjustable with at least 1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection and input calibrating source.

Signal Generator to provide the following frequencies: (Output on these ranges should be adjustable and at least 1 volt maximum.)

(a) Intermediate frequencies:

21.25	mc sound i-f and sound traps
22.8	mc converter transformer
23.9	mc first picture i-f transformer
24.5	mc third picture i-f coil
26.0	mc second picture i-f coil

(b) Radio frequencies:

Channel Number	Picture Carrier Freq. Mc	Sound Carrier Freq. Mc
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of "Junior VoltOhmyst type" and a high voltage probe for use with this meter to permit measurements up to 10 kv.

SERVICE PRECAUTIONS—Cutouts in the bottom of the cabinet make it possible to do some of the servicing of the receiver without removing the chassis. If the receiver is serviced in the cabinet, a soft pad should be placed under the cabinet when it is inverted, in order to avoid scratching the surface. In manufacture, the cabinet receives a Class 1 rub finish and every effort should be made to preserve that finish. The receiver handling precaution on page 11 should also be observed.

If necessary to remove the chassis from cabinet, the Kinescope must first be removed. See Figures 10, 11, and 12. If possible, the chassis should then be serviced without the Kinescope. However, if it is necessary to view the raster during servicing, the Kinescope should be inserted only after the chassis is turned on end. The Kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer "up", all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not permit the Kinescope second-anode lead to become "shorted" to the chassis. To do so will cause a considerable overload on the high-voltage filter resistor R167.

ADJUSTMENTS REQUIRED—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

The r-f oscillator-line adjustment is critical and may be affected by a tube change. The line can be adjusted to the proper frequency on channel 13 with practically any 6J6 tube in the socket. However, it may not then be possible to adjust the line to frequency in all of channels 7, 8, 9, 10, 11, and 12. For an oscillator tube to be satisfactory, it should be possible to adjust the line to proper frequency with the fine-tuning control in the middle of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to realign the oscillator line completely after changing the tube.

Tubes which cannot be used as an oscillator may work satisfactorily as an r-f amplifier or a converter.

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken, and the reasons for these precautions. Then, for more convenient reference during alignment, a tabulation of the method is given. All the information necessary for alignment is given in the tables; however, alignment by the tables should not be attempted before reading the detailed instructions.

ORDER OF ALIGNMENT—A complete receiver alignment can be most conveniently performed in the following order:—

Picture i-f traps
Picture i-f plate coils
Sound discriminator
Sound i-f transformers
R-f and converter lines
R-f oscillator line
Converter grid trap (See Note)
Retouch picture i-f plate coils
    (Steps 8 to 11 inc., page 20)
Sensitivity check

NOTE: In most receivers, the converter grid trap circuit is of fixed value. Consequently, this adjustment is eliminated.

PICTURE I-F TRAP ADJUSTMENT—Set the voltage on the i-f bias bus to approximately —3 volts. Set the station selector switch to channel 9. Connect the "VoltOhmyst" across the picture second-detector load resistor R118. Connect the output of the signal generator through a 1000 mmf. capacitor directly to the converter grid (either end of R5 to ground). Set the generator to 21.25 mc and set the specified adjustment for minimum indication on the "VoltOhmyst". The generator should be checked against a crystal calibrator to insure that it is exactly on frequency.

21.25 mc—T2 (top)
21.25 mc—T101 (top of chassis)

PICTURE I-F TRANSFORMER ADJUSTMENTS—Set the frequency of the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the VoltOhmyst.

22.8 mc—T2 (bottom)
23.9 mc—L101 (top of chassis)
26.0 mc—L102 (top of chassis)
24.5 mc—L103 (top of chassis)

Picture I-F Oscillation—If the receiver is badly misaligned and two or more of the i-f plate coils are tuned to the same frequency, the receiver may fall into i-f oscillation and alignment by the usual method becomes difficult. I-f oscillation shows up as a voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting. If such a condition is encountered, a cure may sometimes be effected by adjusting the plate coils approximately to frequency by setting the adjustment stud extensions of T2, L101, L102, and L103 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, oscillation may possibly be stopped by increasing the grid bias with the picture control. If so, the i-f stages may then be aligned by the usual method. Once aligned in this manner, the i-f amplifier will be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first two i-f amplifiers to ground with 1000 mmf. capacitors. Connect the signal generator to the third i-f tube grid and adjust L103 to frequency. Next, remove the shunting capacitor from the second i-f grid, connect the signal generator to this grid and align L102. Then remove the shunting capacitor from the first i-f grid, connect the signal generator to this grid and align L101. Then connect the signal generator to either end of R5, and align T2 to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass capacitors, i-f coil shunting resistors, tubes, socket voltages, etc.

SOUND DISCRIMINATOR ALIGNMENT—Set the signal generator for approximately 1 volt output at 21.25 mc and connect it to the second sound i-f tube grid. Set the "VoltOhmyst" on the 10 volt scale. Connect the meter in series with a one megohm resistor to the junction of diode resistors R181 and R182 (Terminal "C" of T108). Adjust the primary of T108 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the discriminator output (Pin 1 of V116). Adjust T108 secondary (bottom). A positive or negative voltage may be produced on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T108 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero-voltage output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier. Adjust the sweep band width to approximately 1 mc with the center frequency at approximately 21.25 mc with an output of approximately 1 volt. Connect the oscilloscope to the discriminator output (Pin 1 of V116). The pattern obtained should be similar to that shown in Figure 35. If not, adjust T108 (top) until the wave form is symmetrical. The peak to peak bandwidth of the discriminator should be approximately 350 kc and the curve should be linear from 21.175 mc to 21.325 mc.

SOUND I-F ALIGNMENT—Connect the sweep oscillator to the top end of the trap winding of T2 (on top of the chassis). Connect the oscilloscope to the second sound i-f grid return (terminal A of T107). Insert a 21.25 mc marker signal from the signal generator into the first sound i-f grid. Adjust T107 (top and bottom) for maximum gain and symmetry about the 21.25 mc marker. The pattern obtained should be similar to that shown in Figure 35.

The output level from the sweep should be set to produce approximately 0.3 volts peak-to-peak at the second sound i-f grid return when the final touches on the above adjustment are made. The sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals. The band width at 80% response should be approximately 250 kc.

R-F AND CONVERTER LINE ADJUSTMENT—Connect the r-f sweep oscillator to the receiver antenna terminals. If the sweep oscillator has a 50 ohm single-ended output, balanced output can be obtained by properly terminating the sweep output cable and by connecting a 120 ohm non-inductive resistor in series between the sweep output cable and each receiver antenna terminal. (See Figure 30.) Connect the oscilloscope to the junction of R6 and C14 (in the r-f tuning unit) through a 10,000 ohm resistor. This connection is made on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit. (See Figure 38 for location.) By-pass the first picture i-f grid to ground through a 1000 mmf. capacitor. Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall within the r-f range and distort the picture of the r-f response. Set the picture control for approximately −1.5 volts bias on the r-f stage. For convenience check this voltage at the junction of R106 and the "green" shielded lead from the r-f unit. (See Figure 36.) Connect the signal generator loosely to the receiver antenna terminals.

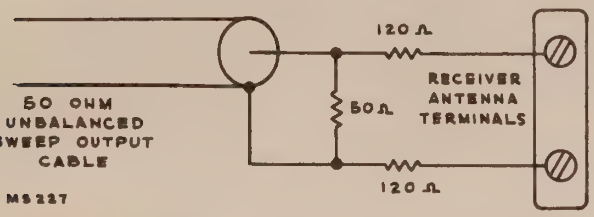


Figure 30—Method of Terminating Sweep Generator

Set the C14 adjustment screw to its approximate normal operating position; 1½ turns out from maximum capacity. If the C14 capacity is less than this, a resonance may be produced in channels 1, 2 or 3. During r-f alignment, such a resonance may show up as a "suck out" in the response curve of one of these channels. Under such conditions the proper response cannot be obtained. With C14 set as specified or in later production receivers in which C14 is fixed, no such difficulty should be experienced.

Since channel 7 has the narrowest response of any of the high-frequency channels, it should be adjusted first. Set the receiver station selector switch to channel 7 (see Figure 38 for shaft flat location versus channel). Set the sweep oscillator to cover channel 7 and insert markers of channel 7 picture carrier and sound carrier; 175.25 mc and 179.75 mc. Adjust L25, L26, L51, and L52 (see Figure 36) for an approximately flat-topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak-to-valley excursion and the markers occur at approximately 90% response. See Figure 37, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the responses of channels 8 through 13 by switching the receiver station selector switch, sweep oscillator, and marker oscillator to each of these channels and observing the response obtained. See Figure 37 for typical response curves. All of these channels should have the properly shaped response with the markers above 70% response. If the markers do not fall within this requirement on one or more high-frequency channels, since there are no individual channel adjustments, then readjust L25, L26, L51, and L52, possibly compromising some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher-frequency channels are comparatively broad and the markers fall well within the required range.

Channel 6 is next aligned in the same manner. Set the receiver to channel 6, the sweep oscillator to the corresponding range, and the marker oscillator to channel 6 picture and sound carrier frequencies. Adjust L11, L12, L37, and L38 for an approximately flat-topped response curve located symmetrically between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator, and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37, and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between the r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with an approximately 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion, which should not be greater than 30% on any channel.

R-F OSCILLATOR LINE ADJUSTMENT—The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound-carrier frequency and adjusting the oscillator for zero voltage output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

The heterodyne frequency meter is the more universal method since it is applicable to all types of receivers. However, it requires a great many calibration points since receivers with different intermediate frequencies employ different oscillator frequencies and hence different calibration points on the frequency meter. This may result in confusion and errors in adjustment.

Since all sets must receive the same stations, the r-f sound carrier frequencies remain the same, regardless of intermediate frequency. By use of the discriminator zeroing method, only one set of calibrating points is necessary. If these frequencies are crystal controlled, this method of alignment is very fast, with little chance for error. However, this method is applicable only on receivers that use a sound discriminator or other type of sound detector that has a definite and measurable characteristic at center frequency. This method cannot be easily employed on receivers that employ a slope type detector. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

ALIGNMENT PROCEDURE (Continued)

Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment. If the dual listing is confusing, the unwanted listing can be easily crossed out.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the following calibration points must be established for the Model 621 TS.

Channel Number	Receiver R-F Osc. Freq. Mc
1	71
2	81
3	87
4	93
5	103
6	109
7	201
8	207
9	213
10	219
11	225
12	231
13	237

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the following signals must be available.

Channel Number	R-F Sound Carrier Freq. Mc
1	49.75
2	59.75
3	65.75
4	71.75
5	81.75
6	87.75
7	179.75
8	185.75
9	191.75
10	197.75
11	203.75
12	209.75
13	215.75

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator. If the r-f sound carrier method is used, connect the "VoltOhmyst" to the sound discriminator output (Pin 1 of V116). The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, the channels must be aligned in reverse numerical order. Set the receiver station-selector switch to channel 13. Adjust the frequency standard to the correct frequency (237 mc for the heterodyne frequency meter or 215.75 mc for the signal generator). Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 (See Figure 39 for location) for zero beat on the heterodyne frequency meter or zero voltage from the sound discriminator. The core stud extensions should be maintained equal by visual inspection except as discussed below.

Switch the receiver to channel 12, set the frequency standard to the proper frequency and adjust L76 (No. 12 in Figure 38) for the above mentioned indications. Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and by adjusting the appropriate oscillator trimmer for the specified indication. (Channel 6 adjustment is on the side of the r-f unit. See Figure 39 for location.) Adjustment of the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range should be possible. After the oscillator has been set on all channels, start back to channel 13 and recheck to make sure that all adjustments are correct.

If, in setting the low frequency channels, the high frequency channels are pulled noticeably off frequency, or if it is impossible to set channels 10, 11, or 12 within the range of their respective core adjustments, there may be interaction between sections of the line. A quick check can be made to determine if this is the case.

The shorting section of the r-f oscillator channel switch, (rotor) should be at ground r-f potential. If there is any dissymmetry in the circuit, the shorting section may be somewhat above ground. Since at these high frequencies, even the length of the shorting bar represents an appreciable portion of a wavelength, the lower-frequency section is effectively tapped up on the high-frequency section and reflects reactance into it. This reactance varies with low-frequency channel oscillator adjustments thus causing a shift in oscillator frequency on the upper channels. One way to cure this difficulty is to adjust the shorting switch to ground potential. This can be accomplished by staggering L77 and L78 until this condition is achieved.

To find whether or not dissymmetry exists, remove the bottom cover from the r-f unit. Set the station-selector switch to channel 10. Disconnect any input from the receiver. Connect the "VoltOhmyst" to R6 through the hole in the side of the chassis, and measure the bias on the converter grid. With an insulated metal prod, touch the center of the oscillator rotor shorting bar. A meter reading change indicates that the bar is not at r-f ground. To balance the line, switch to channel 13 and stagger the cores for one or more turns (usually L78 out and L77 in). The final adjustment must leave the oscillator on correct channel-13 frequency. Switch back to channel 10 and touch the switch rotor again. As before, meter movement indicates unbalance. For fine balancing, touch the switch contacts for channel 10. When balanced, the meter will show equal reduction for both contacts. Continue staggering the cores until balance is obtained. Then repeat the oscillator adjustments for all channels.

In later production receivers, several r-f oscillator coil changes were made and a capacitor (C19) was added to minimize the oscillator pulling effect. In receivers having C19, core staggering should not be necessary.

CONVERTER GRID TRAP ADJUSTMENT—Connect the r-f generator to the receiver antenna terminals. Observe the precaution for single-ended output generators mentioned in the r-f alignment section. Connect the oscilloscope to R6 through 10,000 ohms. Shunt the first picture i-f grid to ground with a 1,000 mmf. capacitor, keeping the leads as short as possible. Couple the marker oscillator loosely to the receiver antenna terminals. Switch the station-selector switch and the marker oscillator through the low-frequency channels and observe the response on each range. Select a channel which is essentially flat over the operating range with the sound and picture carrier markers at 90% or higher on the response curve. Remove the capacitor from the first picture i-f grid and shunt it from the second picture i-f grid to ground. Adjust C14 for an r-f response curve similar to the one obtained with the first picture i-f grid shunted.

In later production receivers, C14 is fixed and obviously this adjustment cannot be made on these sets. In such receivers, this step should be followed as a check on proper converter operation.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—The picture i-f response curve varies somewhat with change of bias and for this reason the receiver should be aligned with approximately the same signal input as it will receive in operation. If the receiver is located at the edge of the service area, it should be aligned with the picture control at the maximum gain position. However, for normal conditions (signals of 800 microvolts or greater), the picture i-f stages should be aligned with a grid bias of −3 volts. Connect the sweep generator to the receiver antenna terminals. Feed in the i-f picture carrier marker of 25.75 mc and a 23 mc marker. Connect the oscilloscope across the picture-detector load resistor. Remove the shunting capacitor from the second picture i-f grid (if C14 was adjusted as outlined above). Set the i-f grid bias to −3 volts and the sweep output to produce approximately 0.3 volt peak-to-peak across the picture-detector load resistor. Observe and analyze the response curve obtained. The response may not be ideal and the i-f adjustments may have to be retouched in order to obtain the desired curve. See Figure 32.

If, for example, the response is peaked in the middle, and the picture carrier is low on the response curve slope, then L102 (which is peaked at 26 mc—near the picture carrier 25.75 mc) should be retouched to bring the picture-carrier response up to approximately 40%. The response may then be generally high on the low-frequency end of the curve. If this is the case, adjust T2 (bottom stud). Lowering the response at the low-frequency end should cause a change in the slope at the high-frequency end of the response curve. The picture carrier is thus brought still further up the slope and an approximately flat-topped response curve is obtained. If a peak or dip is encountered in the "middle" response, it can be corrected by adjusting L101 and L103.

On final adjustment the picture-carrier marker must be approximately at 60% response. The curve must be approximately flat-topped with the 23 mc marker at approximately 100% response.

The above example is used to show the line of reasoning involved in making the retouching adjustments. Since there are four coils, each aligned to a different frequency, many different conditions can exist; however, similar reasoning will apply to each case. With some experience in making these adjustments, the desired response can be readily obtained. In making these adjustments, care should be taken that no two coils are tuned to the same frequency as i-f oscillation may result.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 60% response point. If the picture carrier operates too low on the response curve, loss of low-frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high-frequency video response.

SENSITIVITY CHECK—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained with that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through an attenuator pad of the type shown in Figure 31. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position.

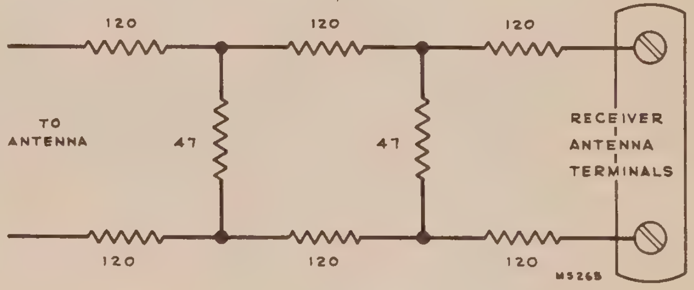


Figure 31—Attenuator Pad

Only composition type resistors should be used to construct the attenuator pad. Since many of the low-value moulded type resistors generally available are of wire-wound construction, one of each type of resistor used should be broken and examined in order to determine its construction.

RESPONSE CURVES—The response curves shown on pages 20, 21, and 22, and referred to throughout the alignment procedure, are typical, but some variations can be expected.

The response curves are shown in the classical manner of presentation; that is, with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT PROCEDURE (Continued)

NOTE: If complete alignment is required, the sequence in which the tables appear below should be followed.

PICTURE I-F AND TRAP ADJUSTMENT (R-F Unit Must Be in Alignment for Steps 8 to 11 Inclusive)

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC	CONNECT "VOLTOHMYST" TO	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
1	—	—	—	—	R106 to chassis	—	Set "Station Selector" switch to channel 9	Adjust "Picture" control for —3 volts reading on "VoltOhmyst"	Fig. 34
2	Converter grid (either end of R-5) in series with 1000 mmf mica capacitor	21.25 with 400 cycle modulation	Not used	—	Picture detector load resistor R118 (Pin 6 of V104)	Not used	Meter on lowest voltage range (See Note 1) Run T101 adjustment screw "out"	T2 secondary core (top stud) for minimum output	Figs. 34, 40, 33
3	"	21.25	"	—	"	"	Meter on lowest range (See Note 1)	T101 for minimum output	Fig. 33
4	"	22.8	"	—	"	"	"	T2 primary core (bottom stud) for maximum output	Fig. 34
5	"	23.9	"	—	"	"	"	L101 for maximum output	Fig. 33
6	"	26.0	"	—	"	"	"	L102 for maximum output	Fig. 33
7	"	24.5	"	—	"	"	"	L103 for maximum output	Fig. 33
8	Loosely coupled to antenna terminals	—	Antenna terminals (See Note 2)	Sweeping channel selected in "Adjust" column	Not used	Junction R6 and C14 through 10,000 ohm series resistor (See Fig. 38, page 23, for location)	Connect 1000 mmf mica capacitor from pin 1 (grid) of V101 to ground (Use short leads)	Select low-frequency channel (1 to 6), by "Station Selector," with an essentially flat response	Figs. 38, 41
9	"	See "Misc." column	"	"	"	Same as above	Adjust signal generator frequency to sound and picture R-F carriers of channel selected in step 8. Carrier "markers" must be at 90% or higher on the R-F response curve.	Select another "flat" channel if markers are not at 90% point on first channel selected. Check this channel with marker signals for desired 90% response	Alignment Table below
10	"	23 and 25.75 repectively	"	"	"	Picture detector load resistor R118 (Pin 6 of V104)	Remove 1000 mmf capacitor from pin 1 of V101 to ground	If response curve is not essentially as shown in Figure 32, with 25.75 mc marker 60% up on response curve slope, proceed with step 11	Figs. 41, 32
11	"	Same as above	"	"	"	"	Retouch adjustments on T2, L101, L102 and L103. T2 affects low-frequency response. L102 affects high-frequency response. L101 and L103 affect "middle" frequency response		Figs. 34, 33, 32

NOTE 1: Oscillation may occur if i-f section is badly out of alignment. This will be evidenced by "excessive" meter reading and is caused by the "staggered" i-f stages being tuned to approximately the same frequency. If encountered, adjust the core studs of L101, L102, and L103 until oscillation ceases. Oscillation may not be encountered until proceeding with steps 4, 5, or 6 (See "Picture I-F Oscillation," page 16).

NOTE 2: If sweep generator has "single ended" output, it will be necessary to disconnect the transmission-line jumper from the terminals adjacent to the r-f tube (V1). Feed the sweep signal in from either terminal to ground. The signal generator marker signal may then be fed into the unused terminal through a 5.6 mmf capacitor. An alternate method for connecting a "single-ended" sweep generator is to use the terminating arrangement shown in Figure 30, page 17.

Channel Number	Picture Carrier Freq. Mc	Sound Carrier Freq. Mc
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

Alignment Table (Carrier Frequencies)

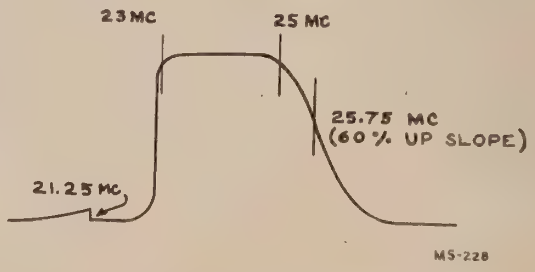


Figure 32—Typical Overall Response Curve

Note: See second paragraph of "Response Curves", page 19.

DISCRIMINATOR & SOUND I-F ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC	CONNECT "VOLTOHMYST" TO	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
1	Grid of 2nd sound I-F tube (Pin 1 of V115)	21.25 at 1 volt output	Not used	—	In series with 1 meg. resistor to Terminal "C" of T108 (Junction of R181 and R182)	Not used	Run T108 secondary core (bottom stud) "out"	Adjust T108 primary core (top stud) for maximum output	Figs. 41, 34, 33
2	"	"	"	—	Discriminator output (Pin 1 of V116)	"	Adjust "VoltOhmyst" for "center zero" on lowest range	Adjust T108 secondary core (bottom stud) for zero d-c output	Figs. 41, 34
3	Not used	—	Grid of 2nd sound i-f tube (Pin 1 of V115)	Center freq. 21.25. Band-width 1 mc. Output 1 V.	Not used	Discriminator output (Pin 1 of V116)	Check for symmetrical response wave-form (positive and negative). If not equal, adjust T108 primary core (top stud) until response is essentially as shown in Figure 35 (see Note 1)		Figs. 41, 33, 35
4	"Insert" marker signal into 1st sound i-f grid circuit	21.25 with reduced output	Across T2 secondary (outside) winding. (Top of winding to chassis)	Same as above, except reduced output (See Note 2)	"	Terminal "A" of T107 ("High" end of R176)	—	Adjust T107 primary and secondary cores (top and bottom) for maximum gain and symmetry about the 21.25 mc marker. Band-width at 80% response should be 250 kc (See Note 3)	Figs. 40, 34, 35

NOTE 1: The peak-to-peak bandwidth of the discriminator should be approximately 350 kc and it should be linear from 21.175 mc to 21.325 mc.

NOTE 2: If a 60 cycle sweep rate is used, it will be necessary to reduce the time constant in the 2nd sound i-f grid circuit in order to reproduce the desired response curve. To do this, shunt R176 (Terminal "A" of T107 to chassis) with 5600 ohms.

NOTE 3: The sweep generator output should be set to produce approximately 0.3 volt peak-to-peak at the second sound i-f grid return (Terminal "A" of T107) for final touch-up on this adjustment. Signal voltage in excess of 0.3 volt will tend to broaden the response curve—permitting misadjustment to pass unnoticed.

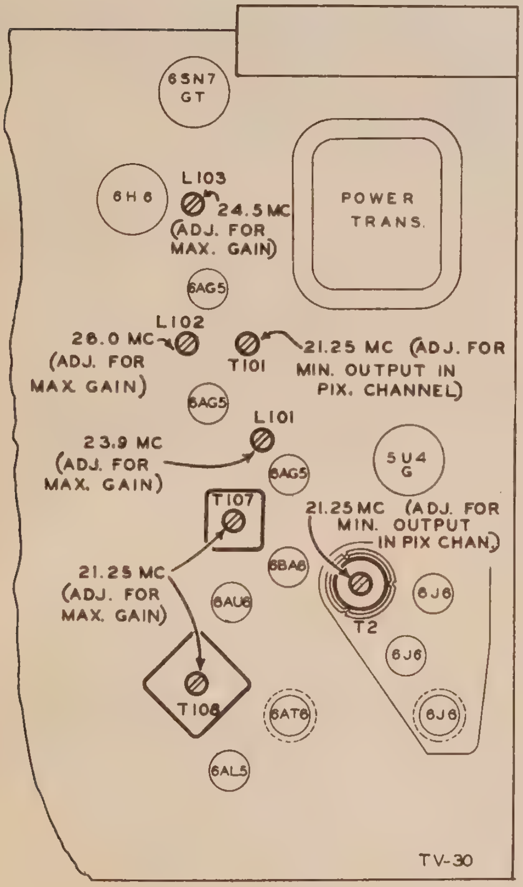

6SN7 GT
6H6
L103
24.5 MC (ADJ. FOR MAX. GAIN)
POWER TRANS.
6AG5
L102
28.0 MC (ADJ. FOR MAX GAIN)
T101
21.25 MC (ADJ. FOR MIN. OUTPUT IN PIX. CHANNEL)
6AG5
L101
23.9 MC (ADJ. FOR MAX. GAIN)
6AG5
5U4 G
T107
21.25 MC (ADJ. FOR MIN. OUTPUT IN PIX CHAN.)
21.25 MC (ADJ. FOR MAX. GAIN)
6BA6
6AU6
T2
6J6
6J6
T108
6AT6
6J6
6AL5
TV-30

Figure 33—Top Chassis Adjustments

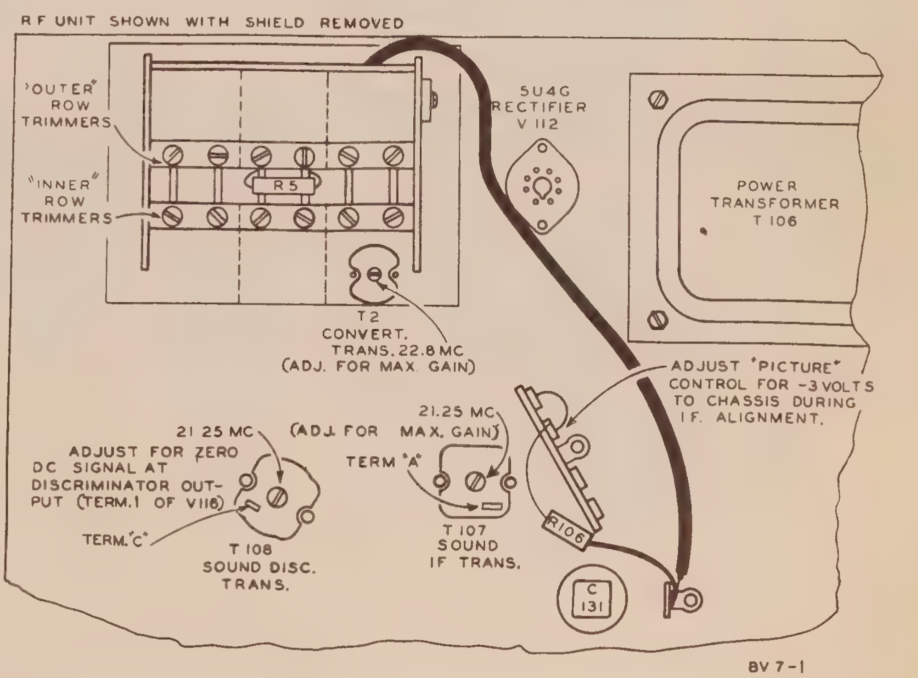

R F UNIT SHOWN WITH SHIELD REMOVED
"OUTER" ROW TRIMMERS
"INNER" ROW TRIMMERS
R5
5U4G RECTIFIER V 112
POWER TRANSFORMER T 106
T2 CONVERT. TRANS. 22.8 MC (ADJ. FOR MAX. GAIN)
ADJUST "PICTURE" CONTROL FOR -3 VOLTS TO CHASSIS DURING I.F. ALIGNMENT.
21.25 MC
21.25 MC (ADJ. FOR MAX. GAIN)
ADJUST FOR ZERO DC SIGNAL AT DISCRIMINATOR OUTPUT (TERM. 1 OF V116)
TERM. "A"
TERM. "C"
T 108 SOUND DISC. TRANS.
T 107 SOUND IF TRANS.
R106
C 131
BV 7-1

Figure 34—Bottom Chassis I-F and Discriminator Adjustments

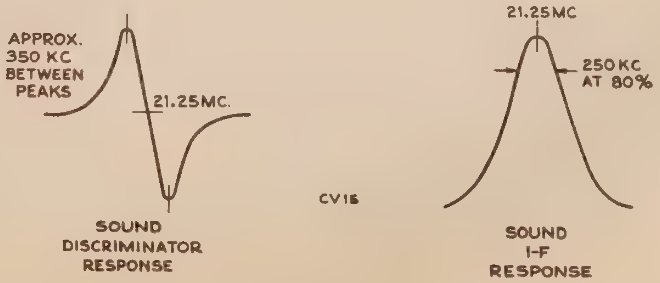


Figure 35

R-F AND CONVERTER LINE ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC	CONNECT "VOLTOHMYST" TO	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
1	Not used		Not used		Junction of R106 and green lead from R-F unit	Not used	Set C14 1½ turns out from max. cap. (See Note)	Picture control for —1.5 volts on meter	Fig. 36
2	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (See Note 2 under "Picture and I-F Trap Adjustment" table)	Sweeping channel 7	Not used	Junction R6 and C14through 10,000 ohm series resistor (See Fig. 38 for Location)	Connect 1000 mmf mica capacitor from pin 1 (grid) of V101 to ground (Use short leads). Receiver on channel 7	L25, L25, L51 & L52 for approx. flat-top response between markers. Markers above 70%	Fig. 41 Fig. 36 Fig. 37 (7)
3	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 37 (8)
4	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 37 (9)
5	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 37 (10)
6	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 37 (11)
7	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 37 (12)
8	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 37 (13)
9	If the response on any channel (steps 3 through 8) is below 70% at either marker, switch to that channel and adjust L25, L26, L51, & L52 to pull response up on that channel. Then recheck steps 2 through 8.								
10	Antenna terminal (loosely)	83.25 87.75	Antenna terminals (See Note 2 under "Picture and I-F Trap Adjustment" table)	Sweeping channel 6	Not used	Junction R6 and C14through 10,000 ohm series resistor (See Fig. 38 for Location)	Receiver on channel 6	L11, L12, L37 & L38 for response as above	Fig. 36 Fig. 37 (6)
11	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 37 (5)
12	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 37 (4)
13	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 37 (3)
14	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	Fig. 37 (3)
15	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 37 (1)
16	If the response on any channel (steps 11 through 15) is below 70% at either marker, switch to that channel and adjust L11, L12, L37, & L38 to pull response up on that channel. Then recheck steps 10 through 15.								

NOTE: In most receivers, C14 is of fixed value.

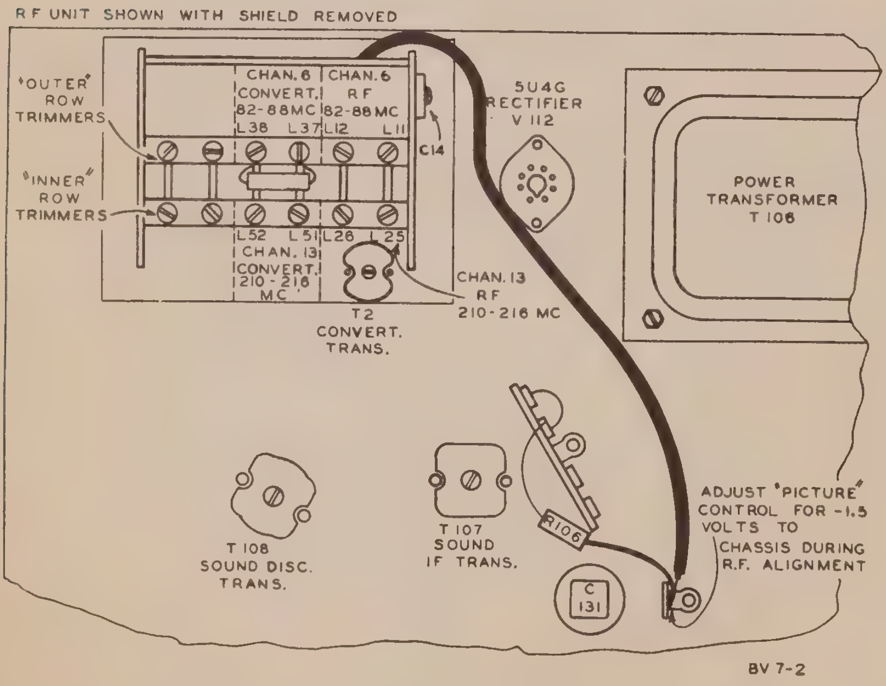

R F UNIT SHOWN WITH SHIELD REMOVED
"OUTER" ROW TRIMMERS
"INNER" ROW TRIMMERS
CHAN. 6 CONVERT. 82-88MC
CHAN. 6 R F 82-88 MC
L38
L37
L12
L11
C14
L52
L51
L26
L25
CHAN. 13 CONVERT. 210-216 MC
CHAN. 13 RF 210-216 MC
T2 CONVERT. TRANS.
5U4G RECTIFIER V 112
POWER TRANSFORMER T 106
T 108 SOUND DISC. TRANS.
T 107 SOUND IF TRANS.
R106
C 131
ADJUST "PICTURE" CONTROL FOR -1.5 VOLTS TO CHASSIS DURING R.F. ALIGNMENT
BV 7-2

Figure 36—Bottom Chassis R-F and Converter Adjustments

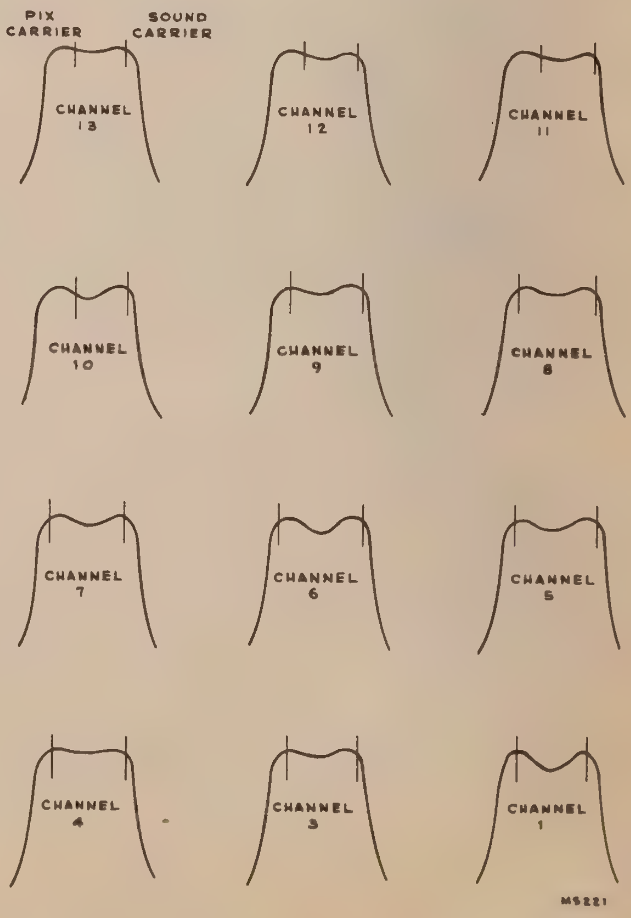


Figure 37—Typical R-F Response Curves

ALIGNMENT PROCEDURE (Continued)

R-F OSCILLATOR ALIGNMENT

STEP No.	*CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC	*CONNECT "VOLTOHMYST" TO	‡CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
1	Antenna terminals	215.75	Pin 1 of V-116 for sig. gen. method only	Loosely coupled to r-f osc.	237	Not used	Fine tuning centered for all adjustments Receiver on channel 13	L77 & L78 for zero on meter or beat on het. freq. meter	Fig. 41 Fig. 39
2	"	209.75	"	"	231	"	Receiver on channel 12	L76 as above (Screw 12)	Fig. 38
3	"	203.75	"	"	225	"	Receiver on channel 11	L74 as above (Screw 11)	Fig. 38
4	"	197.75	"	"	219	"	Receiver on channel 10	L72 as above (Screw 10)	Fig. 38
5	"	191.75	"	"	213	"	Receiver on channel 9	L70 as above (Screw 9)	Fig. 38
6	"	185.75	"	"	207	"	Receiver on channel 8	L68 as above (Screw 8)	Fig. 38
7	"	179.75	"	"	201	"	Receiver on channel 7	L66 as above (Screw 7)	Fig. 38
8	"	87.75	"	"	109	"	Receiver on channel 6	L63 & L64 as above	Fig. 39
9	"	81.75	"	"	103	"	Receiver on channel 5	L62 as above (Screw 5)	Fig. 38
10	"	71.75	"	"	93	"	Receiver on channel 4	L60 as above (Screw 4)	Fig. 38
11	"	65.75	"	"	87	"	Receiver on channel 3	L58 as above (Screw 3)	Fig. 38
12	"	59.75	"	"	81	"	Receiver on channel 2	L56 as above (Screw 2)	Fig. 38
13	"	49.75	"	"	71	"	Receiver on channel 1	L54 as above (Screw 1)	Fig. 38
14	Repeat steps 2 through 13 as a check.								

*Method I requires signal generator and "VoltOhmyst".
‡Method II requires heterodyne frequency meter only.

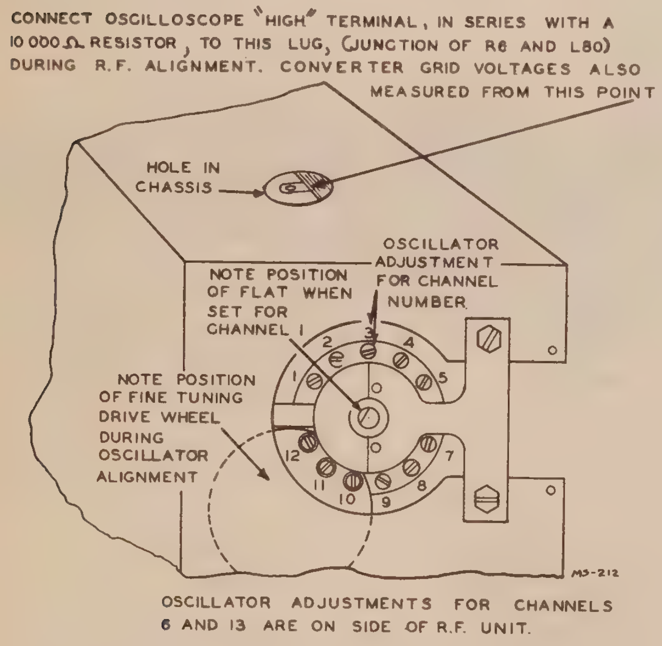

CONNECT OSCILLOSCOPE "HIGH" TERMINAL, IN SERIES WITH A 10 000 Ω RESISTOR, TO THIS LUG, (JUNCTION OF R6 AND L80) DURING R.F. ALIGNMENT. CONVERTER GRID VOLTAGES ALSO MEASURED FROM THIS POINT
HOLE IN CHASSIS
OSCILLATOR ADJUSTMENT FOR CHANNEL NUMBER
NOTE POSITION OF FLAT WHEN SET FOR CHANNEL 1
NOTE POSITION OF FINE TUNING DRIVE WHEEL DURING OSCILLATOR ALIGNMENT
1
2
3
4
5
7
8
9
10
11
12
MS-212
OSCILLATOR ADJUSTMENTS FOR CHANNELS 6 AND 13 ARE ON SIDE OF R.F. UNIT.

Figure 38—Front Chassis Oscillator Adjustments

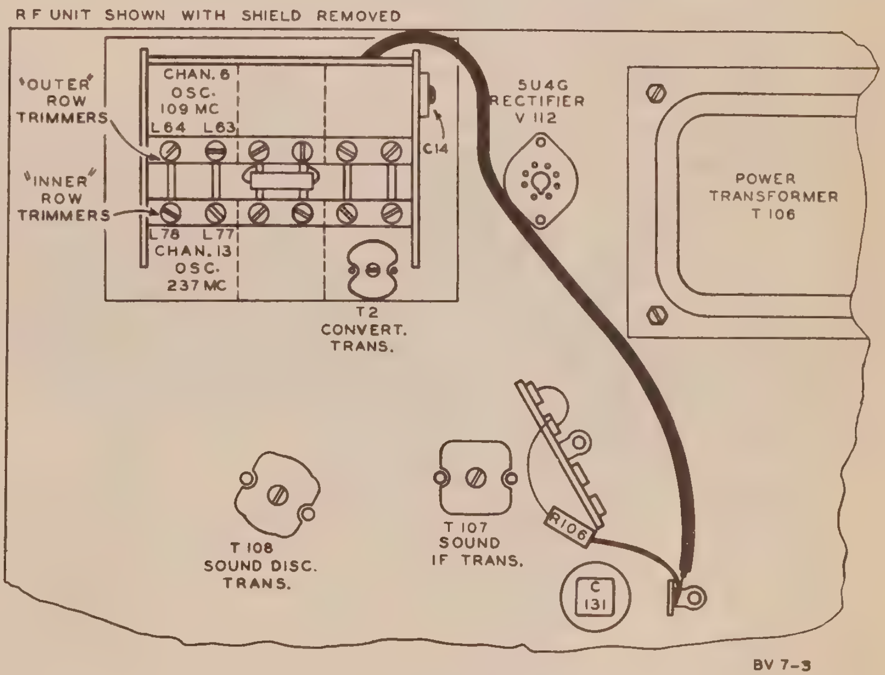
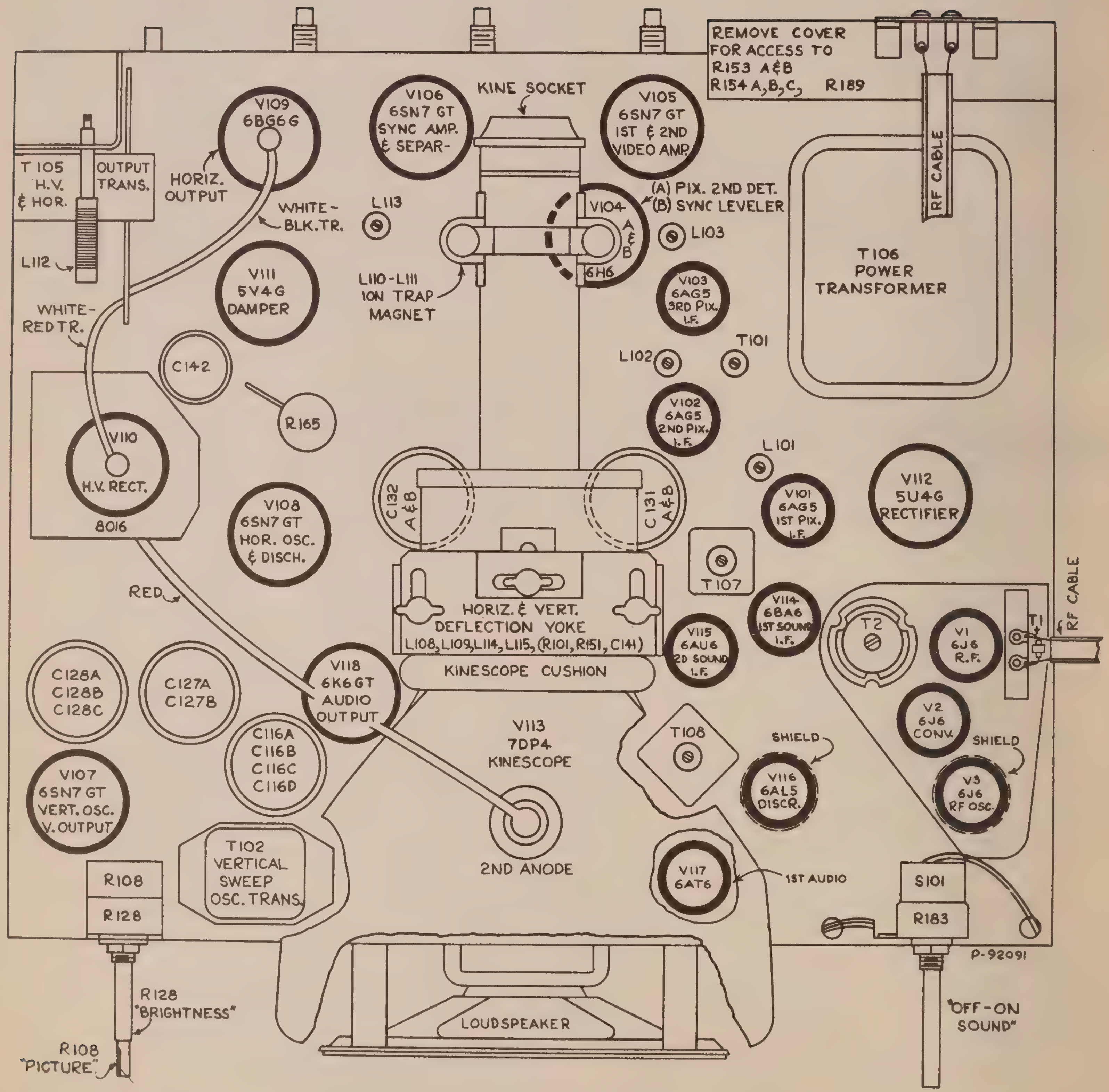

R F UNIT SHOWN WITH SHIELD REMOVED
"OUTER" ROW TRIMMERS
"INNER" ROW TRIMMERS
CHAN. 6 OSC. 109 MC
L64 L63
C14
L78 L77
CHAN. 13 OSC. 237 MC
T2 CONVERT. TRANS.
5U4G RECTIFIER V 112
POWER TRANSFORMER T 106
T 108 SOUND DISC. TRANS.
T 107 SOUND IF TRANS.
R106
C 131
BV 7-3

Figure 39—Bottom Chassis Oscillator Adjustments

CONVERTER GRID TRAP ADJUSTMENT (C14 in R-F Unit)

NOTE: In most receivers, C14 is of fixed value. Consequently, this adjustment will not be required.

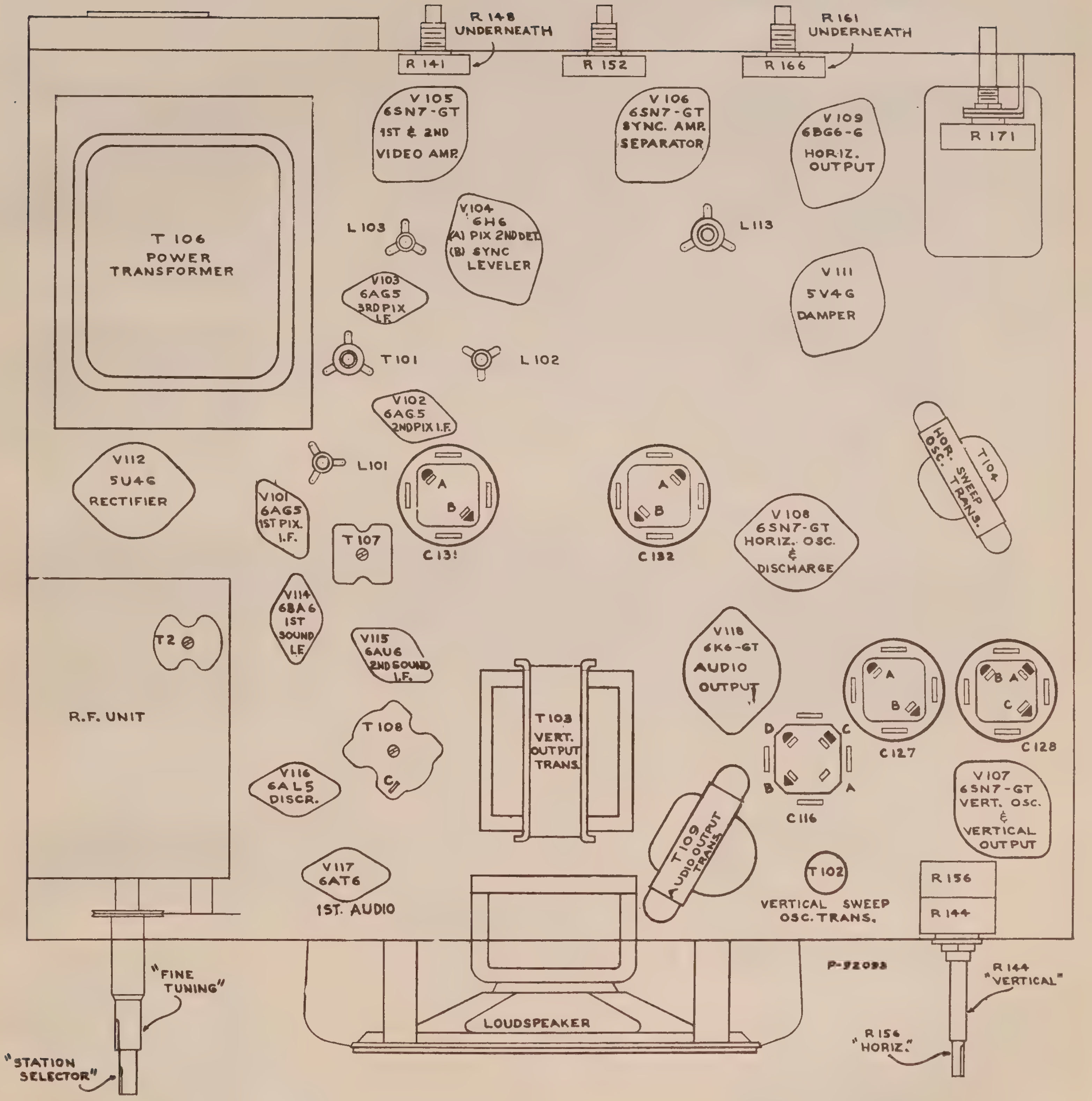
STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC	CONNECT OSCILLOSCOPE TO	MISCELLANEOUS CONNECTIONS AND ADJUSTMENTS	ADJUST	REFER TO
1	Antenna terminals (loosely)	Required markers (See Alignment Table, page 20)	Antenna terminals (See Note 2 under "Picture I-F Alignment" Table)	Sweep Channel selected under "Adjust"	Junction R6 and C14 through 10,000 ohm series resistor	Connect 1000 mmf mica capacitor from pin 1 (grid) of V101 to ground. (Use short leads)	Switch through channels 1 to 6. Select channel with flat response and markers above 90%	Figs. 38, 41
2	"		"	"	"	Move 1000 mmf capacitor from grid of V101 to grid (pin 1) of V102 to ground	Adjust C14 for response curve similar to that obtained above	Figs. 41, 39


REMOVE COVER FOR ACCESS TO R153 A&B R154 A,B,C, R189
V109 6BG6G
HORIZ. OUTPUT
T105 H.V. & HOR.
OUTPUT TRANS.
L112
WHITE-BLK.TR.
WHITE-RED TR.
V106 6SN7 GT SYNC AMP. & SEPAR-
KINE SOCKET
V105 6SN7 GT 1ST & 2ND VIDEO AMP.
(A) PIX. 2ND DET.
(B) SYNC LEVELER
V104 A & B 6H6
L113
L103
L110-L111 ION TRAP MAGNET
RF CABLE
T106 POWER TRANSFORMER
V111 5V4G DAMPER
V103 6AG5 3RD PIX. I.F.
C142
R165
L102
T101
V110 H.V. RECT.
8016
V102 6AG5 2ND PIX. I.F.
L101
C132 A&B
C131 A&B
V101 6AG5 1ST PIX. I.F.
V112 5U4G RECTIFIER
V108 6SN7 GT HOR. OSC. & DISCH.
T107
RED
HORIZ. & VERT. DEFLECTION YOKE L108, L109, L114, L115, (R101, R151, C141)
KINESCOPE CUSHION
V114 6BA6 1ST SOUND I.F.
V115 6AU6 2D SOUND I.F.
T2
T1
RF CABLE
V1 6J6 R.F.
C128A C128B C128C
C127A C127B
V118 6K6GT AUDIO OUTPUT
V113 7DP4 KINESCOPE
T108
SHIELD
V116 6AL5 DISCR.
V2 6J6 CONV.
SHIELD
V3 6J6 RF OSC.
C116A C116B C116C C116D
V107 6SN7 GT VERT. OSC. V. OUTPUT
T102 VERTICAL SWEEP OSC. TRANS.
2ND ANODE
V117 6AT6
1ST AUDIO
S101
R183
R108
R128
P-92091
LOUDSPEAKER
R128 "BRIGHTNESS"
R108 "PICTURE"
"OFF-ON SOUND"

NOTE: On some units, V116 is a 6AT6 (see schematic diagram).

Figure 40—Chassis Top View (Showing Location of Major Components)

CHASSIS BOTTOM VIEW

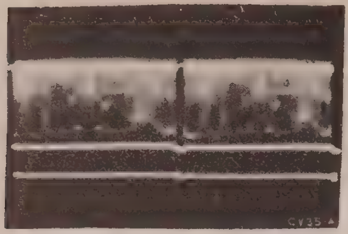

R 148 UNDERNEATH
R 141
R 152
R 161 UNDERNEATH
R 166
R 171
V 105 6SN7-GT 1ST & 2ND VIDEO AMP.
V 106 6SN7-GT SYNC. AMP. SEPARATOR
V 109 6BG6-G HORIZ. OUTPUT
T 106 POWER TRANSFORMER
L 103
V104 6H6 (A) PIX 2ND DET. (B) SYNC LEVELER
L 113
V 111 5V4G DAMPER
V103 6AG5 3RD PIX I.F.
T 101
L 102
V102 6AG5 2ND PIX I.F.
L101
V112 5U4G RECTIFIER
V101 6AG5 1ST PIX. I.F.
T 107
A
B
C 131
C 132
HOR. OSC. SWEEP TRANS.
T104
V 108 6SN7-GT HORIZ. OSC. & DISCHARGE
V114 6BA6 1ST SOUND I.F.
T2
V115 6AU6 2ND SOUND I.F.
V118 6K6-GT AUDIO OUTPUT
R.F. UNIT
T 108
T 103 VERT. OUTPUT TRANS.
C
D
C 116
C 127
C 128
V116 6AL5 DISCR.
V107 6SN7-GT VERT. OSC. & VERTICAL OUTPUT
T 109 AUDIO OUTPUT TRANS.
T 102 VERTICAL SWEEP OSC. TRANS.
R 156
R 144
V117 6AT6 1ST. AUDIO
P-92093
"FINE TUNING"
"STATION SELECTOR"
LOUDSPEAKER
R 144 "VERTICAL"
R 156 "HORIZ."

NOTE: On some units, V116 is a 6AT6 (see schematic diagram).

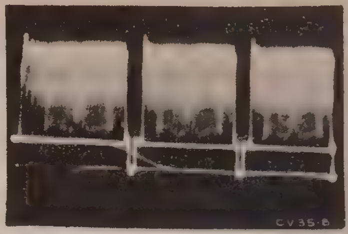
Figure 41—Chassis Bottom View (Showing Location of Major Components)

WAVEFORM PHOTOGRAPHS

Peak to peak voltages shown are nominal when 1½ volt peak to peak video signal is applied to 1st video amplifier (V105).

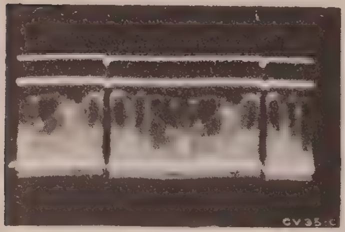


Video Signal Input to 1st Video Amplifier (At Pin 5 of V104A)

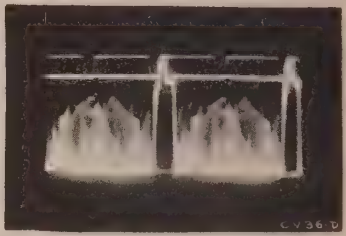


(A) Vertical (1.5 Volts, P to P)

(B) Horizontal (1.5 Volts, P to P)

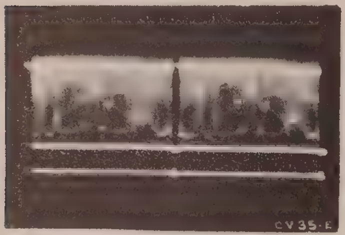


Output of 1st Video Amplifier (Pin 4 of V105)

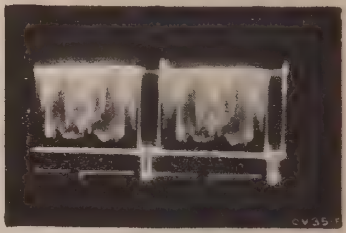


(C) Vertical (5.0 Volts, P to P)

(D) Horizontal (5.0 Volts, P to P)

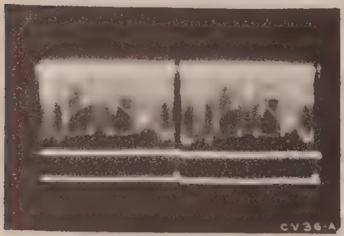


Input to Kinescope Grid (Junction of L106 and Green Lead to Kinescope Socket)

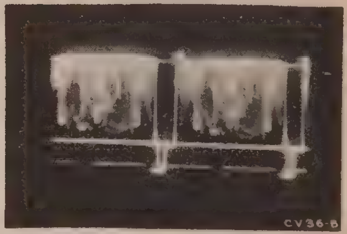


(E) Vertical (32 Volts, P to P)

(F) Horizontal (32 Volts, P to P)

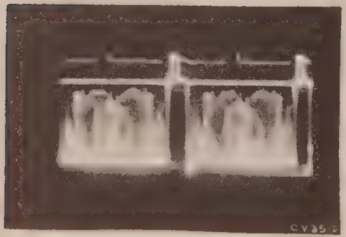


Input to Grid Sync Amplifier (Pin 1 of V106)

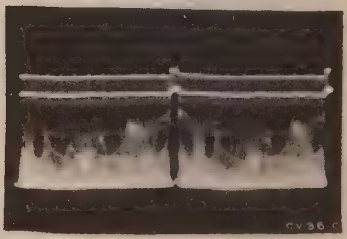


(G) Vertical (8 Volts, P to P)

(H) Horizontal (8 Volts, P to P)

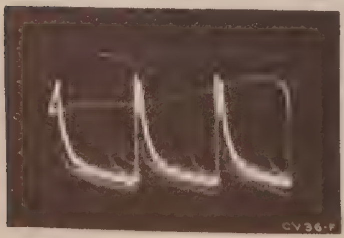


Input to Sync Separator (Pin 2 of V106)

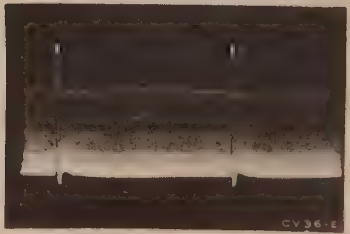


(I) Vertical (96 Volts, P to P)

(J) Horizontal (96 Volts, P to P)



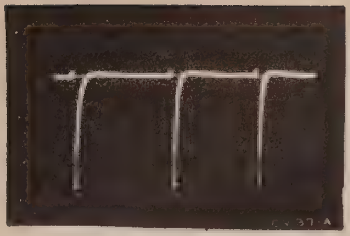
Output of Sync Separator (Pin 6 of V106)



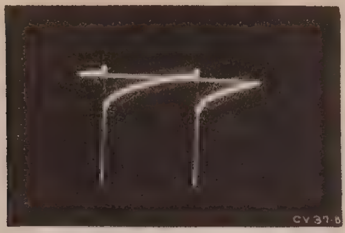
(K) Vertical (8 Volts, P to P)

(L) Horizontal (7.5 Volts, P to P)

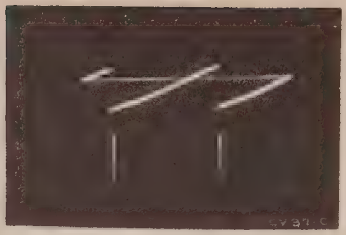
WAVEFORM PHOTOGRAPHS



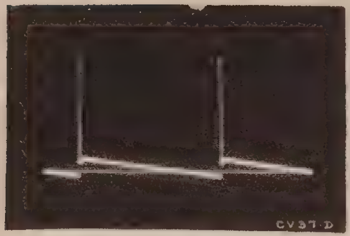
(M) *Vertical (20 Volts, P to P) Output of Integrating Network (Junction of R138 and C125)*



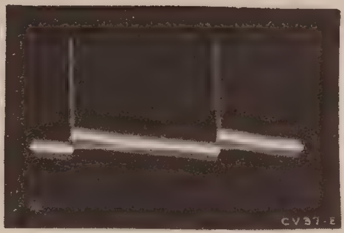
(N) *Grid of Vertical Oscillator Tube (200 Volts, P to P) (Pin 1 of V107)*



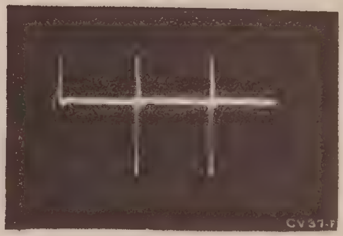
(O) *Input to Vertical Output Tube (45 Volts, P to P) (Junction of C129 and C130)*



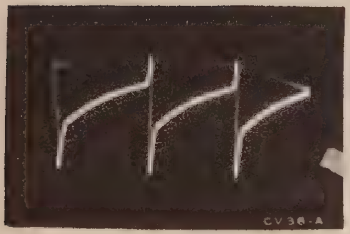
(P) *Plate of Vertical Output Tube (700 Volts, P to P) (Pin 5 of V107)*



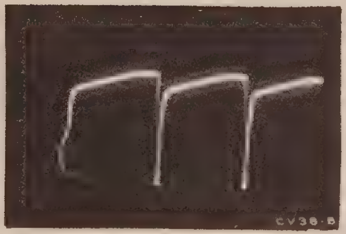
(Q) *Voltage Across Vertical Deflection Coils of Yoke (L108, L109) (70 Volts, P to P) (At Green Lead of T103 to Ground)*



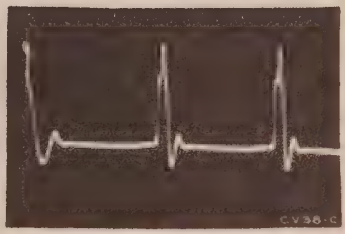
(R) *Input to Horizontal Oscillator Tube (70 Volts, P to P) (Junction of R132 and R133)*



(S) *Grid of Horizontal Oscillator Tube (Pin 1 of V108)*

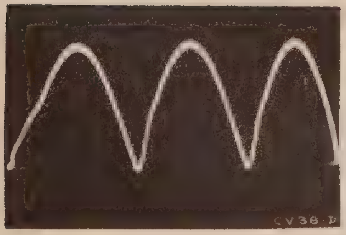


(T) *Plate of Horizontal Discharge (200 Volts, P to P) (Pin 5 of V108)*

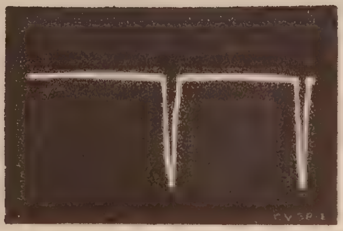


(U) *Plate of Horizontal Output Tube (Approx. 5000 Volts, P to P)*

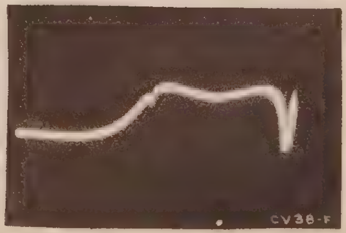
(Measured Through a Capacity Voltage Divider Connected from Top Cap of V109 to Ground)



(V) *Boosted +B and Horizontal Linearity Waveform (43 Volts, P to P) (Term. 1 of T105)*



(W) *Voltage Across Horizontal Deflection Coils of Yoke (L114, L115) (1440 Volts, P to P) (Pins 4 or 6 of V111 to Ground)*



(X) *Response of 1st and 2nd Video Amplifier Stages (Marker at 3MC on Left) (Video Sweep Input to Pin 1 of V105) (Output: Pin 2 of V113 Socket) (Diode Used Had 10 mmf. Capacity)*

SERVICE SUGGESTIONS

Some of the possible troubles that may be encountered, with their effects and causes, are listed below:

NO RASTER ON KINESCOPE—The effect of no raster can be caused by the following:—

(1) Incorrect adjustment of ion trap magnet. Open coil; negative bleeder open; coils reversed.

(2) No high voltage. Check V109 (6BG6-G) and V110 (8016) tubes and circuits. If the horizontal-deflection circuits are operating, as evidenced by the correct waveform measured on terminal 4 of horizontal output transformer T105, the trouble can be isolated to the high-voltage rectifier (V110) circuit. Either the high-voltage winding (points 2 to 3 on T105) is open; the 8016 tube is defective; its filament circuit is open; or the high-voltage filter capacitor C142 is shorted.

(3) Damper tube (V111, 5V4-G) inoperative. Plate voltage supply for 6BG6-G horizontal output tube is obtained through the damper tube. Check tube, and heater winding on T106. If tube is O.K., check L113 (horizontal linearity coil) for continuity, and capacitors C139 and C140 for short circuit.

(4) Defective Kinescope. Heater open; cathode "return" circuit open.

(5) No plate voltage. Shorted electrolytic capacitor; open speaker field coil. All +B measurements are accessible for measurement by removing cover from bleeder box located below antenna terminals. (See Figures 40 and 44.)

(6) Horizontal osc. and discharge tube (V108, 6SN7-GT) inoperative. Check for sawtooth on grid of horizontal output tube (V109, 6BG6-G). If not present, check waveforms, voltages, and components in V108 circuits.

HORIZONTAL DEFLECTION ONLY—If horizontal deflection only is obtained, evidenced by a "straight line" across the face of the Kinescope, it can be caused by the following:

(1) Vertical oscillator and output tube (V107, 6SN7-GT) inoperative. Check waveforms and voltages on grid and plate.

(2) Vertical output transformer (T103) open.

(3) Vertical yoke open.

POOR VERTICAL LINEARITY—If adjustment of the vertical height and linearity controls will not correct this condition, any of the following may be the cause:

(1) Vertical output transformer (T103) defective.

(2) Capacitors C128-C or C127-B defective.

(3) V107 (6SN7-GT) defective. Check waveforms and voltages.

(4) Excess leakage or incorrect value in capacitor C130.

(5) Low plate and bias voltages. Check rectifier tube and capacitors in +B supply circuits.

(6) Capacitor C129 defective or incorrect in value.

POOR HORIZONTAL LINEARITY—If adjustment of controls does not correct this condition, check the following:

(1) Check or replace horizontal output tube (V109, 6BG6-G).

(2) Check or replace damper tube (V111, 5V4-G).

(3) Check waveform on grid of V109.

(4) Check linearity coil L113 for short circuit.

(5) Check capacitors C139 and C140 for defects or incorrect values.

(6) Check R165 for incorrect value or open circuit.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER—This condition can be caused by:

Defective yoke.

WRINKLES ON LEFT SIDE OF RASTER—This condition can be caused by:

Defective yoke due to R101, R151, or C141 (internal in yoke assembly) being wrong value or open. These components are mounted in rear of yoke assembly.

SMALL RASTER—This condition can be caused by:

(1) Low +B or line voltage.

(2) Insufficient output from horizontal output tube V109 (6BG6-G). Replace tube.

RASTER—NO IMAGE, BUT ACCOMPANYING SOUND—This condition can be caused by:

(1) No signal on Kinescope grid. Check picture i-f amplifier tubes V101 (6AG5), V102 (6AG5), V103 (6AG5), second detector V104 (6H6), and video amplifier V105 (6SN7-GT).

(2) Bad contact to kinescope grid. (Lead to socket broken.)

SIGNAL APPEARS ON KINESCOPE GRID BUT IS UNABLE TO SYNCHRONIZE THE PICTURE VERTICALLY AND HORIZONTALLY—A condition of this nature can be caused by:

(1) Defective sync amplifier and separator tube (V106, 6SN7-GT).

(2) If tube is O.K., check voltages, waveforms and associated circuits.

SIGNAL ON KINESCOPE GRID AND HORIZONTAL SYNC ONLY—If this condition is encountered, check:

Vertical integrating network capacitors C122, C123, C124, C125, and resistors R136, R137, R138.

PICTURE STABLE BUT WITH POOR RESOLUTION—If the picture resolution is not up to standard, it may be caused by any of the following:

(1) Sub-standard picture detector tube (V104, 6H6) or video amplifier tube (V105, 6SN7-GT).

(2) Open video peaking coil. Check all peaking coils (L104, L105, L106, L107) for continuity. Note that L105 and L106 have shunting resistors.

(3) Leakage in V105 grid capacitor C115.

If above components are not found to be defective, check the following:—

(1) Check all potentials in video circuits.

(2) Check Kinescope grid circuit for poor or dirty contact.

(3) Check adjustment of focus control (R171). It should be effective on either side of proper focus.

(4) Check and realign, if necessary, the picture i-f and r-f circuits.

PICTURE SMEAR—This trouble can originate in either the transmitter or the receiver. Check reception from another station. Normally, smear can be attributed to phase shift at the low-frequency end of the video characteristic. This can be caused by improper values of R and C in the video circuits. Check for grid current on video amplifier tube V105.

PICTURE JITTER—

(1) If regular sections at the left of the picture are displaced, replace the horizontal output tube (V109, 6BG6-G).

(2) Vertical instability may be due to loose connections or "noise" received with the signal.

(3) Horizontal instability may be due to unstable transmitted sync, or to "noise."

CRITICAL LEAD DRESS

Dress speaker field leads away from 6K6-GT (V118) socket and behind vertical output transformer T103.

Dress blue lead of vertical output transformer away from V118 socket.

Dress plate leads of 6BG6-G (V109) and 8016 (V110) tubes away from each other and away from width-control (L112) coil.

Twist leads from width-control (L112) coil.

Dress leads from horizontal hold control (R156) away from leads from vertical hold control (R144).

Keep leads from i-f transformers short.

In replacing components that have a connection to chassis ground, be certain to make ground connection to same chassis lance that was used in original factory wiring.

If replacement of horizontal output and high voltage transformer (T105) is required, check lead dress to be sure maximum spacing between leads is maintained, as shown in Figure 42.

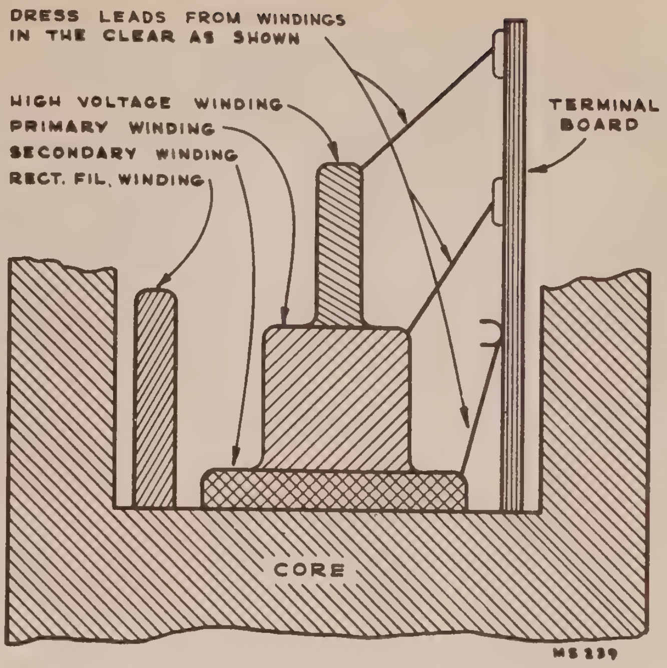

DRESS LEADS FROM WINDINGS IN THE CLEAR AS SHOWN
HIGH VOLTAGE WINDING
PRIMARY WINDING
SECONDARY WINDING
RECT. FIL. WINDING
TERMINAL BOARD
CORE
MS 239

Figure 42—T105 Lead Dress

NOTES

Modification of the synch circuit has been made in some receivers installed in low signal areas.

Modification # 1

C 119 is 100 mmf., R 134 is 3.9 meg. and is connected to chassis grd. instead of to — 20 — volts.

Modification # 2

A -1 meg. resistor has been added from pin #3 of V-104B to chassis grd.

Antenna Wave Trap:

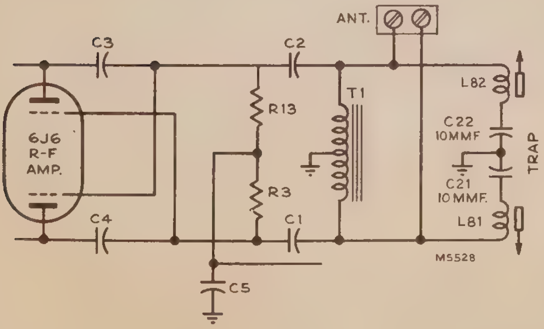
In some instances interference may be encountered from FM stations that are on the image frequency of a television station. In other instances interference between two television stations may be observed.

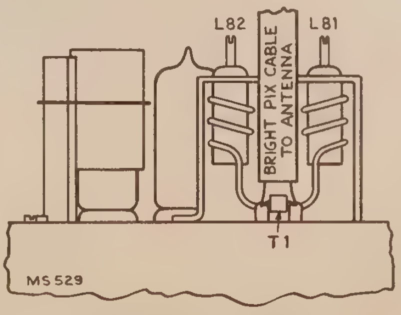
Assume that two television stations in a city are operating on channels 6 and 10. When the receiver is tuned to channel 6, a small amount of the oscillator voltage (109 mc.) is present on the r-f amplifier grid. This 109 mc. voltage beats with the channel 10 picture carrier and produces an 84.25 mc. signal. This signal falls within the channel 6 range and interferes with the reception of channel 6. A similar case occurs between channels 5 and 7.

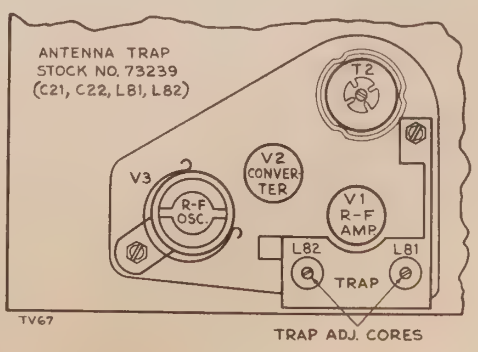
A series resonant trap across the r-f amplifier grid circuit will remove the oscillator voltage from the grids and will minimize this type of interference. Such a trap was installed on those receives which experienced this type of interference.

To adjust the trap, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. Keep both cores approximately equal. Turn one core ½ turn from the original position, then readjust the second core for minimum interference in the picture. Repeat until the best rejection is obtained. For shop alignment the cores of this trap should be run out before proceeding with r-f and converter line adjustment. After the receiver alignment is completed, the trap should be retuned.

The illustrations below illustrate the schematic diagram and location of the trap.

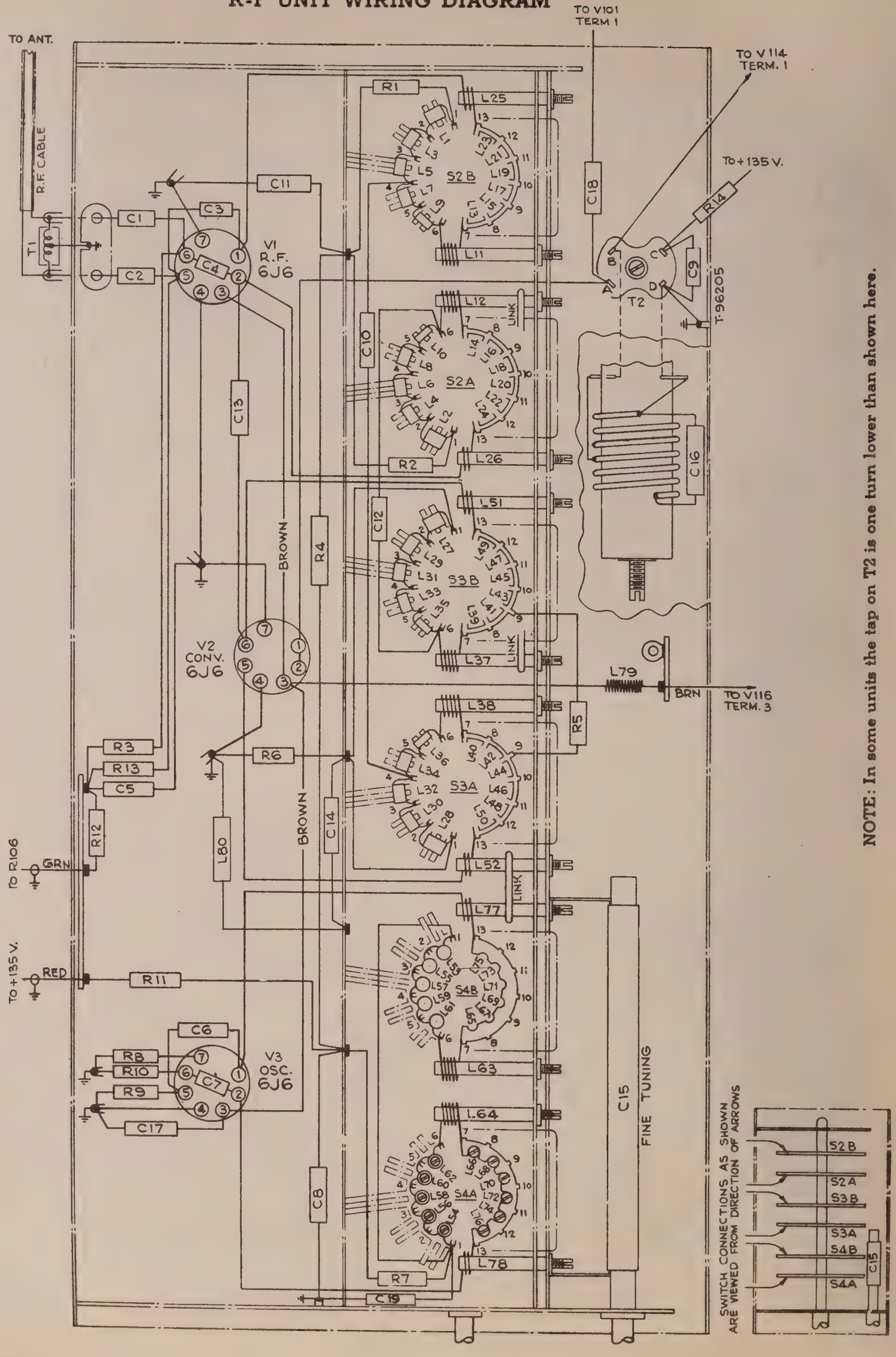

ANT.
C3
C2
6J6
R-F
AMP.
R13
R3
T1
C4
C1
C5
L82
C22
10MMF
C21
10MMF.
L81
TRAP
MS528


L82
L81
BRIGHT PIX CABLE TO ANTENNA
T1
MS529


ANTENNA TRAP
STOCK NO. 73239
(C21, C22, L81, L82)
T2
V3
R-F OSC.
V2 CONVERTER
V1 R-F AMP.
L82
L81
TRAP
TV67
TRAP ADJ. CORES

R-F UNIT WIRING DIAGRAM

NOTE: In some R-F Units, capacitor C14 is a variable trimmer and is connected between L80 and ground. L80 is connected to R6.

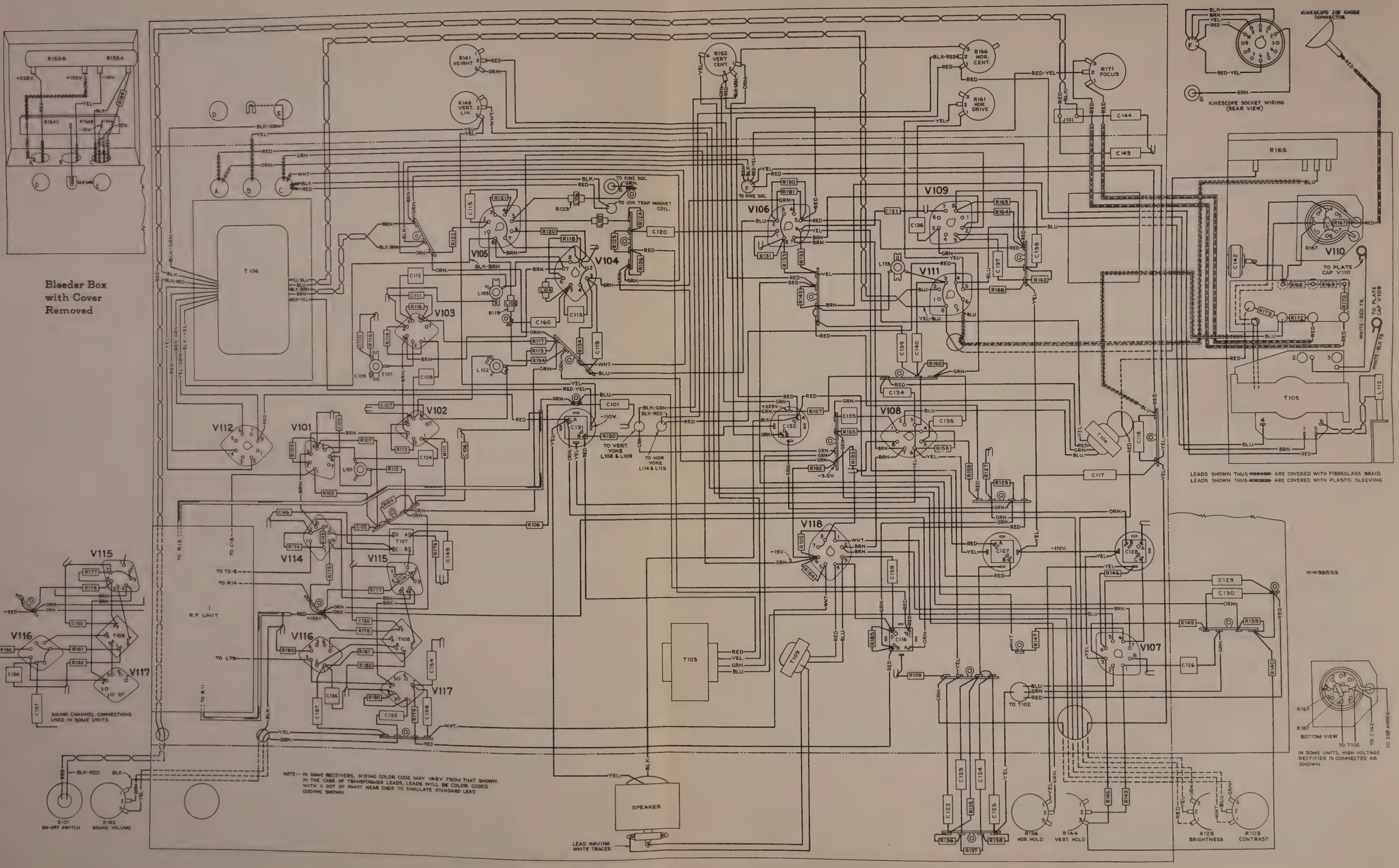

TO V101 TERM 1
TO ANT.
R.F. CABLE
TO V114 TERM. 1
TO +135 V.
T1
C1
C2
C3
C4
C11
V1 R.F. 6J6
R1
L25
S2B
L1
L3
L5
L7
L9
L11
L13
L15
L17
L19
L21
L23
C18
R14
B
C
A
D
C9
T2
T-96205
L12
LINK
S2A
L2
L4
L6
L8
L10
L14
L16
L18
L20
L22
L24
C10
C13
R2
L26
C16
L51
S3B
L27
L29
L31
L33
L35
L37
L39
L41
L43
L45
L47
L49
C12
BROWN
R4
V2 CONV. 6J6
L79
BRN
TO V116 TERM. 3
R5
L38
S3A
L28
L30
L32
L34
L36
L40
L42
L44
L46
L48
L50
R3
R13
C5
R6
R12
C14
L80
TO R106
GRN
L52
L77
S4B
L53
L55
L57
L59
L61
L63
L65
L67
L69
L71
L73
L75
TO +135 V.
RED
R11
C6
R8
R10
R9
C7
C17
V3 OSC. 6J6
L64
S4A
L54
L56
L58
L60
L62
L66
L68
L70
L72
L74
L76
L78
C8
R7
C19
C15
FINE TUNING
SWITCH CONNECTIONS AS SHOWN ARE VIEWED FROM DIRECTION OF ARROWS
S2B
S2A
S3B
S3A
S4B
S4A
C15

NOTE: In some units the tap on T2 is one turn lower than shown here.

NOTE: Capacitor C19 is not used in some R-F Units.

Figure 43—R-F Unit Wiring Diagram

CHASSIS WIRING DIAGRAM


Bleeder Box with Cover Removed
R153B
R153A
+225V.
+135V.
-110V.
R154C
R154B
R154A
-15V.
-20V.
R188
A
B
C
D
E
F
T106
V101
V102
V103
V104
V105
V106
V107
V108
V109
V110
V111
V112
V114
V115
V116
V117
V118
R141 HEIGHT
R148 VERT. LIN.
R152 VERT CENT.
R166 HOR. CENT.
R171 FOCUS
R161 HOR DRIVE
J101
C144
C143
KINESCOPE 2ND ANODE CONNECTOR
KINESCOPE SOCKET WIRING (REAR VIEW)
R165
R167
TO PLATE CAP V110
TO PLATE CAP V109
WHITE-RED TR.
WHITE-BLK TR.
T105
L112
TO KINE SOC.
TO ION TRAP MAGNET COIL.
TO VERT. YOKE L108 & L109
TO HOR YOKE L114 & L115
+225V.
-110V.
-15V.
-3.5V.
+135V.
R.F UNIT
TO R12
TO C18
TO T2-8
TO R14
TO L79
TO R11
T107
T108
T103
T104
T109
TO T102
SPEAKER
LEAD HAVING WHITE TRACER
S101 ON-OFF SWITCH
R183 SOUND VOLUME
SOUND CHANNEL CONNECTIONS USED IN SOME UNITS
R156 HOR HOLD
R144 VERT. HOLD
R128 BRIGHTNESS
R108 CONTRAST
WW93533
R167
R187
BOTTOM VIEW
TO T105
TO C142
TO 2ND ANODE
RED
YEL.
GRN.
BLU.
BRN
ORN.
WHT.
BLK

LEADS SHOWN THUS ▬▬ ARE COVERED WITH FIBREGLASS BRAID.
LEADS SHOWN THUS ▬▬ ARE COVERED WITH PLASTIC SLEEVING

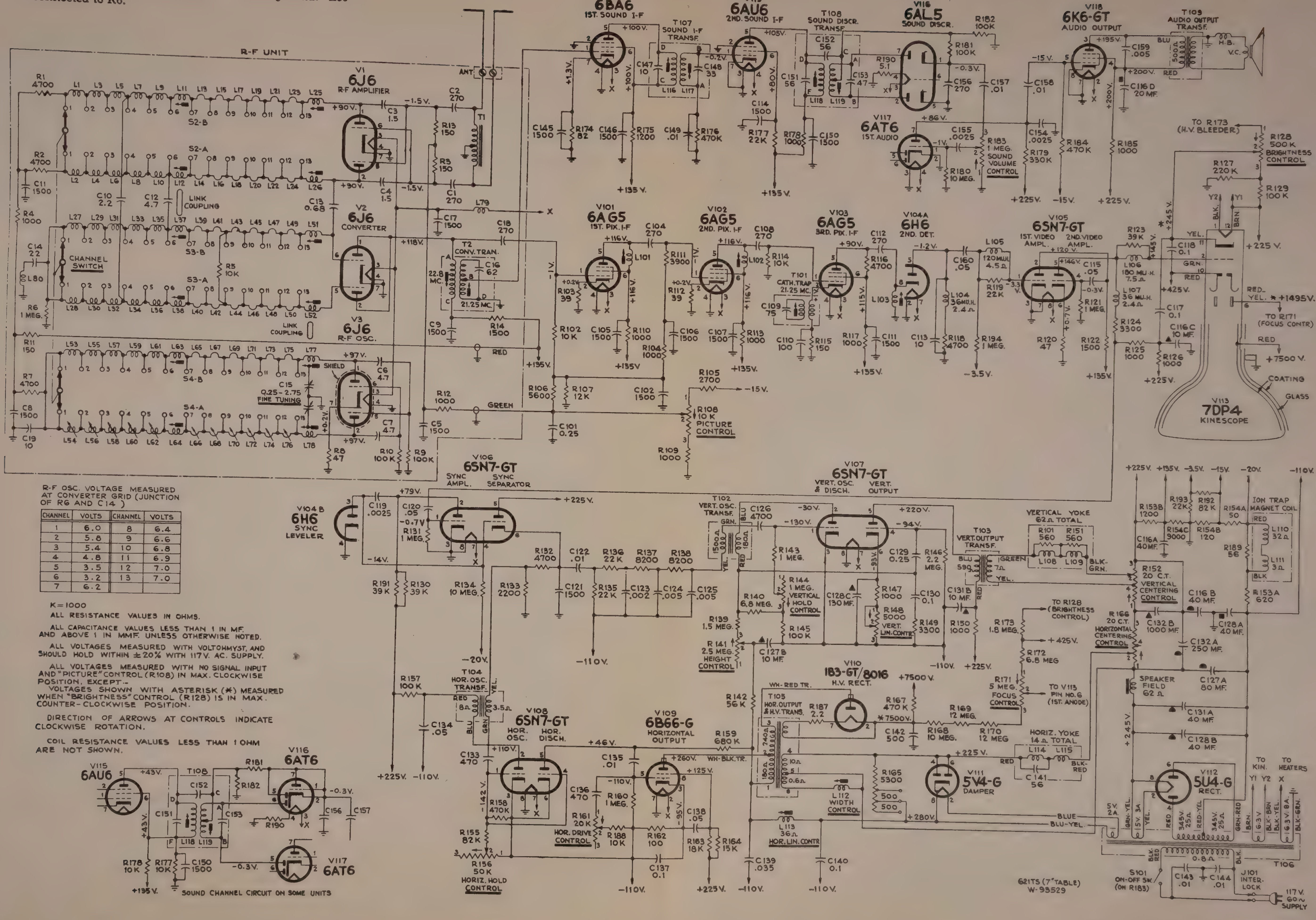
IN SOME UNITS, HIGH VOLTAGE RECTIFIER IS CONNECTED AS SHOWN

NOTE:- IN SOME RECEIVERS, WIRING COLOR CODE MAY VARY FROM THAT SHOWN. IN THE CASE OF TRANSFORMER LEADS, LEADS WILL BE COLOR CODED WITH A DOT OF PAINT NEAR ENDS TO SIMULATE STANDARD LEAD CODING SHOWN.

Figure 44—Chassis Wiring Diagram

OVERALL SCHEMATIC DIAGRAM

NOTE: In some R-F Units, capacitor C14 is a variable trimmer and is connected between L80 and ground. L80 is connected to R6.


R-F UNIT
V1 6J6 R-F AMPLIFIER
V2 6J6 CONVERTER
V3 6J6 R-F OSC.
CHANNEL SWITCH
LINK COUPLING
C15 0.25-2.75 FINE TUNING
T2 CONV. TRAN.
V114 6BA6 1ST. SOUND I-F
T107 SOUND I-F TRANSF.
V115 6AU6 2ND. SOUND I-F
T108 SOUND DISCR. TRANSF.
V116 6AL5 SOUND DISCR.
V117 6AT6 1ST. AUDIO
R183 1 MEG. SOUND VOLUME CONTROL
V118 6K6-GT AUDIO OUTPUT
T109 AUDIO OUTPUT TRANSF.
V101 6AG5 1ST. PIX. I-F
V102 6AG5 2ND. PIX. I-F
V103 6AG5 3RD. PIX. I-F
T101 CATH. TRAP 21.25 MC.
V104A 6H6 2ND. DET.
V105 6SN7-GT 1ST. VIDEO AMPL. 2ND. VIDEO AMPL.
R108 10 K PICTURE CONTROL
R128 500 K BRIGHTNESS CONTROL
TO R173 (H.V. BLEEDER)
TO R171 (FOCUS CONTR.)
V113 7DP4 KINESCOPE
COATING
GLASS
+7500 V.
V104 B 6H6 SYNC LEVELER
V106 6SN7-GT SYNC AMPL. SYNC SEPARATOR
T102 VERT. OSC. TRANSF.
V107 6SN7-GT VERT. OSC. & DISCH. VERT. OUTPUT
R144 1 MEG. VERTICAL HOLD CONTROL
R141 2.5 MEG. HEIGHT CONTROL
R148 5000 VERT. LIN. CONTR.
T103 VERT. OUTPUT TRANSF.
VERTICAL YOKE 62 Ω TOTAL
R152 20 C.T. VERTICAL CENTERING CONTROL
R166 20 C.T. HORIZONTAL CENTERING CONTROL
ION TRAP MAGNET COIL
V110 1B3-GT/8016 H.V. RECT.
T105 HOR. OUTPUT & H.V. TRANS.
R171 5 MEG. FOCUS CONTROL
TO V113 PIN NO. 6 (1ST. ANODE)
T104 HOR. OSC. TRANSF.
V108 6SN7-GT HOR. OSC. HOR. DISCH.
V109 6B6G-G HORIZONTAL OUTPUT
R161 20 K HOR. DRIVE CONTROL
R156 50 K HORIZ. HOLD CONTROL
L112 WIDTH CONTROL
L113 36 Ω HOR. LIN. CONTR.
V111 5V4-G DAMPER
HORIZ. YOKE 14 Ω TOTAL
SPEAKER FIELD 62 Ω
V112 5U4-G RECT.
T106
S101 ON-OFF SW. (ON R183)
J101 INTER-LOCK
117 V. 60 ~ SUPPLY
TO KIN. Y1 Y2
TO HEATERS X
V115 6AU6
V116 6AT6
V117 6AT6
SOUND CHANNEL CIRCUIT ON SOME UNITS
621TS (7" TABLE) W-93529

R-F OSC. VOLTAGE MEASURED AT CONVERTER GRID (JUNCTION OF R6 AND C14)

CHANNEL	VOLTS	CHANNEL	VOLTS
1	6.0	8	6.4
2	5.8	9	6.6
3	5.4	10	6.8
4	4.8	11	6.9
5	3.5	12	7.0
6	3.2	13	7.0
7	6.2		

K=1000

ALL RESISTANCE VALUES IN OHMS.

ALL CAPACITANCE VALUES LESS THAN 1 IN MF. AND ABOVE 1 IN MMF. UNLESS OTHERWISE NOTED.

ALL VOLTAGES MEASURED WITH VOLTOHMYST, AND SHOULD HOLD WITHIN ±20% WITH 117V. AC. SUPPLY.

ALL VOLTAGES MEASURED WITH NO SIGNAL INPUT AND "PICTURE" CONTROL (R108) IN MAX. CLOCKWISE POSITION, EXCEPT—

VOLTAGES SHOWN WITH ASTERISK (*) MEASURED WHEN "BRIGHTNESS" CONTROL (R128) IS IN MAX. COUNTER-CLOCKWISE POSITION.

DIRECTION OF ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION.

COIL RESISTANCE VALUES LESS THAN 1 OHM ARE NOT SHOWN.

Figure 45—Overall Circuit Schematic Diagram

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
65401	Capacitor—Mica, 270 mmf. (C18)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 front and rear converter grid coil and channel #1 front and rear r-f amplifier plate coil (L1, L2, L27, L28)
71469	Coil—Channel #1 front or rear oscillator coil (L53, L54)
71480	Coil—Channel #4 front and rear r-f amplifier plate coils (L7, L8)
71470	Coil—Channel #2 front, channel #3 front, or channel #4 front oscillator coil (L56, L58, L60)
71479	Coil—Channel #2 front and rear r-f amplifier coils, channel #4 front and rear converter grid coils, channel #2 front and rear, channel #3 front and rear r-f amplifier plate coils (L3, L4, L5, L6, L29, L30, L33, L34)
72597	Coil—Channel #3 front and rear converter grid coils (L31, L32)
72552	Coil—Channel #3 rear oscillator coil (L57)
72553	Coil—Channel #4 rear oscillator coil (L59)
71472	Coil—Channel #5 rear oscillator coil (L61)
71481	Coil—Channel #5 front and rear converter grid coils, channel #5 front and rear r-f amplifier coils (L9, L10, L35, L36)
71471	Coil—Channel #2 rear or channel #5 front oscillator coil (L55, L62)
71492	Coil—Channel #6 front and rear oscillator converter grid and r-f amplifier plate coils (L11, L12, L37, L38, L63, L64)
71488	Coil—Channel #13 front oscillator coil (L78)
71489	Coil—Channel #13 rear oscillator coil (L77)
71490	Coil—Channel #13 front converter grid or r-f amplifier plate coil (L26, L52)
71491	Coil—Channel #13 rear converter grid or r-f amplifier plate coil (L25, L51)
71506	Coil—Converter grid trap coil (L80)
71505	Coil—Heater choke coil (L79)
71493	Connector—Segment connector
71497	Core—Channel #6 oscillator coil adjustable core
71498	Core—Channels #6 and #13 converter grid and r-f amplifier coils adjustable core
71597	Core—Channel #13 oscillator coils adjustable core
71463	Detent—R-F unit detent mechanism and fibre shaft
71465	Disc—Rotor disc for fine tuning stator (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for channels #6 and #13 coils —less winding
71462	Loop—Oscillator to converter grid coupling loop
30732	Resistor—47 ohms, ½ watt (R8)
30880	Resistor—150 ohms, ½ watt (R3, R11, R13)
34766	Resistor—1000 ohms, ½ watt (R4, R12, R14)
30494	Resistor—4700 ohms, ½ watt (R1, R2, R7)
3078	Resistor—10,000 ohms, ½ watt (R5)
3252	Resistor—100,000 ohms, ½ watt (R9, R10)
30652	Resistor—1 megohm, ½ watt (R6)
14343	Ring—Retainer ring for drive
71475	Screw—#4-40 x .296 adjusting screw for coils L54, L56, L58, , L60, L62
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils (L66, L68, L70, L72, L74, L76)
71473	Segment—Converter grid and r-f amplifier plate front section's segment less coils (Part of S2, S3)
71474	Segment—Converter grid, and r-f amplifier plate section's segment less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment less coils (Part of S4)
71468	Segment—Oscillator section rear segment less coils (Part of S4)
71494	Socket—Tube socket, miniature
71461	Spring—Snap spring to hold fine tuning shaft and disc
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
72811	Transformer—Converter transformer (stamped 970144-4) (T2, C16)

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES KCS 21-1
71894	Bearing—Bearing for r-f unit shaft
71460	Board—"Antenna" board
71791	Cable—R-F cable
66646	Capacitor—Mica, 10 mmf. (C113)
45469	Capacitor—Ceramic, 100 mmf. (C110)
65401	Capacitor—Mica, 270 mmf. (C104, C108, C112, C156)
65399	Capacitor—Mica, 470 mmf. (C133, C136)
71450	Capacitor—Ceramic, 500 mmf. (C142)
71501	Capacitor—Ceramic, 1500 mmf. (C102, C105, C106, C107, C111, C114, C121, C145, C146, C150)
72524	Capacitor—Mica, 4700 mmf. (C126)
71436	Capacitor—Electrolytic comprising 1 section of 250 mfd., 10 volts and 1 section of 1000 mfd., 6 volts (C132A, C132B)
70601	Capacitor—Tubular, .002 mfd., 200 volts (C123)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C119, C154, C155)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C124, C125, C159)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C122, C135, C149, C157, C158)
71770	Capacitor—Tubular, .01 mfd., 400 volts (C143, C144)
71518	Capacitor—Oil, impregnated, .035 mfd., 600 volts (C139)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C115, C120, C134, C138, C160)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C140)
71912	Capacitor—Tubular, 0.1 mfd., 200 volts (C130)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C117, C118, C137)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C101, C129)
71779	Capacitor—Electrolytic comprising 1 section of 40 mfd., 300 volts, 1 section of 20 mfd., 300 volts, 1 section of 10 mfd., 300 volts and 1 section of 40 mfd., 250 volts (C116A, C116B, C116C, C116D)
71780	Capacitor—Electrolytic comprising 1 section of 80 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C127A, C127B)
71781	Capacitor—Electrolytic comprising 1 section of 40 mfd., 450 volts, 1 section of 40 mfd., 150 volts and 1 section of 130 mfd., 50 volts (C128A, C128B, C128C)
71782	Capacitor—Electrolytic comprising 1 section of 40 mfd., 450 volts and 1 section of 10 mfd., 350 volts (C131A, C131B)
71778	Coil—Cathode trap coil (T101, C109)
71449	Coil—Horizontal linearity coil (L113)
71793	Coil—Peaking coil (L104, L107)
71528	Coil—Peaking coil (L106, R123)
71529	Coil—Peaking coil (L105, R119)
71429	Coil—Width control coil (L112)
71789	Connector—Anode connector
71521	Contact—Hi-voltage capacitor lead contact
71784	Control—Brightness, picture control (R108, R128)
71788	Control—Focus control (R171)
71440	Control—Height control (R141)
71447	Control—Horizontal drive control (R161)
71441	Control—Vertical linearity control (R148)
71443	Control—Vertical or horizontal centering control (R152, R166)
71445	Control—Vertical and horizontal hold control (R144, R156)
71785	Control—Volume control and power switch (R183, S101)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytic capacitors, #'s 71780 and 71781
71783	Cover—Insulating cover for electrolytic capacitors, #'s 71436 and 71437
71509	Cushion—Deflection yoke hood upper cushion
71510	Cushion—Deflection yoke hood lower cushion
71451	Nut—Speed nut to mount hi-voltage capacitor
18469	Plate—Bakelite mounting plate for electrolytic capacitors #'s 71436, 71780, 71781, and 71782
71448	Plug—2 prong male plug for power cable
72066	Resistor—2.2 ohms, ⅓ watt (R187)
72067	Resistor—5.1 ohms, ½ watt (R190)
11956	Resistor—39 ohms, ½ watt (R103, R112)
30732	Resistor—47 ohms, ½ watt (R120)
71992	Resistor—56 ohms, 1 watt (R189)
13961	Resistor—82 ohms, ½ watt (R174)
70715	Resistor—100 ohms, 1 watt (R162)

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
30880	Resistor—150 ohms, ½ watt (R115)
71916	Resistor—1000 ohms, 1 watt (R178, R185)
34766	Resistor—1000 ohms, ½ watt (R104, R109, R110, R113, R117, R125, R126, R147, R150)
30731	Resistor—1200 ohms, ½ watt (R175)
30654	Resistor—1500 ohms, ½ watt (R122)
34767	Resistor—2200 ohms, ½ watt (R133)
30730	Resistor—2700 ohms, ½ watt (R105)
71986	Resistor—3300 ohms, 1 watt (R124)
30733	Resistor—3300 ohms, ½ watt (R149)
30694	Resistor—3900 ohms, ½ watt (R111)
30494	Resistor—4700 ohms, ½ watt (R116, R118, R132)
30734	Resistor—5600 ohms, ½ watt (R106)
14250	Resistor—8200 ohms, ½ watt (R137, R138)
3078	Resistor—10,000 ohms, ½ watt (R102, R114, R188)
30436	Resistor—12,000 ohms, ½ watt (R107)
70723	Resistor—15,000 ohms, 1 watt (R164)
18757	Resistor—18,000 ohms, 1 watt (R163)
30492	Resistor—22,000 ohms, ½ watt (R135, R136, R177, R193)
71084	Resistor—39,000 ohms, 1 watt (R130, R191)
30650	Resistor—56,000 ohms, ½ watt (R142)
8064	Resistor—82,000 ohms, ½ watt (R155, R192)
3252	Resistor—100,000 ohms, ½ watt (R129, R145, R157, R181, R182)
14583	Resistor—220,000 ohms, ½ watt (R127)
14983	Resistor—330,000 ohms, ½ watt (R179)
30648	Resistor—470,000 ohms, ½ watt (R158, R176, R184)
72521	Resistor—470,000 ohms, 1 watt (R167)
30562	Resistor—680,000 ohms, ½ watt (R159)
71786	Resistor—Wire wound comprising 1 section of 1200 ohms, 8 watt and 1 section of 620 ohms, 10 watt (R153A, R153B)
71787	Resistor—Voltage divider, comprising 1 section of 9000 ohms, 2.5 watt, 1 section of 120 ohms, 2 watt and 1 section of 50 ohms, 1 watt (R154A, R154B, R154C)
71439	Resistor—Wire wound resistor comprising 1 section of 5300 ohms, 20 watt and 2 sections of 500 ohms, 2 watt (R165)
30652	Resistor—1 megohm, ½ watt (R121, R131, R143, R160, R194)
31449	Resistor—1.5 megohms, ½ watt (R139)
39063	Resistor—1.8 megohms, 1 watt (R173)
30649	Resistor—2.2 megohms, ½ watt (R146)
31071	Resistor—6.8 megohms, ½ watt (R140)
72523	Resistor—6.8 megohms, 2 watt (R172)
30992	Resistor—10 megohms, ½ watt (R134, R180)
31107	Resistor—10 megohms, 2 watt (R168)
72522	Resistor—12 megohms, 2 watt (R169, R170)
71456	Screw—Wing screw for deflection yoke
71790	Socket—Kinescope socket
71508	Socket—Tube socket, octal, for 8016 tube
72516	Socket—Tube socket, miniature, 7 contact for 6AU6 and 6BA6 tubes
36500	Socket—Tube socket, miniature, 7 contact
31251	Socket—Tube socket, octal, 8 contact
71559	Spring—Grounding spring for hi-voltage capacitor
71426	Transformer—First, second or third picture i-f transformer (L101, L102, L103)
71427	Transformer—Sound discriminator transformer (T108, L118, L119, C151, C152, C153)
71776	Transformer—Audio output transformer (T109)
71416	Transformer—Hi-voltage transformer (T105)
71773	Transformer—Horizontal oscillator transformer (T104)
71772	Transformer—Power transformer, 110 volts, 60 cycle (T106)
71424	Transformer—Sound i-f transformer (T107, L116, L117, C147, C148)

STOCK No.	DESCRIPTION
71775	Transformer—Vertical oscillator transformer (T102)
71774	Transformer—Vertical output transformer (T103)
71792	Trap—Ion trap magnet (L110, L111)
71777	Yoke—Deflection yoke (L108, L109, L114, L115, R101, R151, C141)

SPEAKER ASSEMBLY
92565-1W

STOCK No.	DESCRIPTION
71797	Speaker—6" x 4" elliptical E.M. speaker complete

NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

MISCELLANEOUS

STOCK No.	DESCRIPTION
72427	Back—Cabinet back
72431	Bracket—Safety glass upper bracket
72432	Bracket—Safety glass lower bracket
X1625	Cloth—Grille cloth
72429	Decal—"Off-on Sound and Station Selector" decal for walnut and standard mahogany cabinets
72428	Decal—"Picture-Brightness and Horizontal-Vertical" decal for walnut and standard mahogany cabinets
72823	Decal—Control panel decal ("Off-On Sound and Station Selector" and "Picture Brightness and Horizontal-Vertical" decal for toasted mahogany cabinets)
71984	Decal—Trade mark decal
71598	Escutcheon—Channel marker escutcheon
72433	Felt—Safety glass felt (2 required)
72113	Foot—Rubber foot for cabinet (4 required)
72430	Glass—Safety glass
71534	Knob—Channel selector knob (outer) for walnut or standard mahogany instruments
72568	Knob—Channel selector knob (outer) for toasted mahogany instruments
71536	Knob—Horizontal hold or contrast control knob (inner) for walnut or standard mahogany instruments
72569	Knob—Horizontal hold or contrast control knob (inner) for toasted mahogany instruments
71533	Knob—Fine tuning knob (inner) for walnut or standard mahogany instruments
72567	Knob—Fine tuning knob (inner) for toasted mahogany instruments
71535	Knob—Sound volume and power switch, vertical hold or brightness control knob (outer) for walnut or standard mahogany instruments
72565	Knob—Sound volume and power switch, vertical hold or brightness control knob (outer) for toasted mahogany instruments
71537	Knob—Sound volume and power switch knob (inner) for walnut or standard mahogany instruments
72566	Knob—Sound volume and power switch knob (inner) for toasted mahogany instruments
71538	Spring—Spring clip for escutcheon
14270	Spring—Retaining spring for knob, #'s 71534, 71535, 71537, 72565, 72566 and 72568.
4982	Spring—Retaining spring for knob, #'s 71533 and 72567
30330	Spring—Retaining spring for knob, #'s 71536 and 72569
71539	Support—Support slide with rubber cushion for kinescope (4 required)

NOTE: On those units utilizing the sound channel circuit shown in the lower left corner of the schematic diagram, the following parts list changes are effective:

Stock No. 71495—Transformer—Converter transformer (stamped 970144-2) (T2, C16) is used in place of Stock No. 72811 Transformer.

C114 is not used.

R178 is Stock No. 71914—Resistor, 10,000 ohms, 1 watt.

R177 is same as R102.

Stock No. 72516—Socket—Tube socket, miniature, 7 contact for 6AU6 and 6BA6 tubes—is not used.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

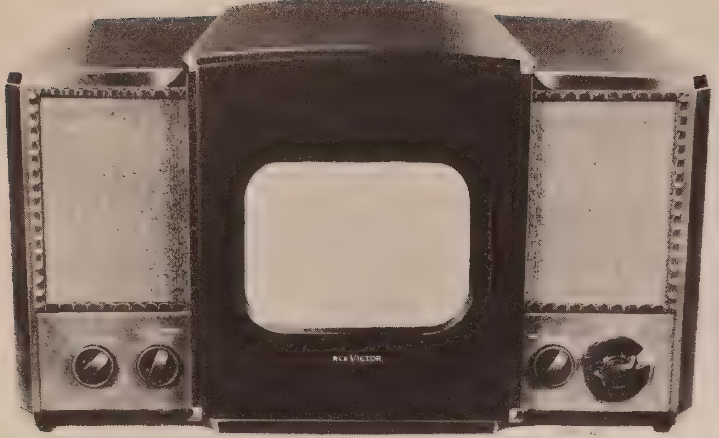
TELEVISION RECEIVER MODEL 630TS

Chassis No. KCS 20A (60 cycles) and KCS 20C-2 (50 cycles)—Mfr. No. 274

SERVICE DATA

—1946 No. T1—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



Model 630TS
Walnut or Mahogany

GENERAL DESCRIPTION

Model 630TS is a thirty-tube, direct-viewing, 10" table model, Television Receiver. The receiver is complete in one unit and is operated by the use of seven front-panel controls. Features of the receiver include: Full thirteen channel coverage; F-M sound system; Improved picture brilliance; A-F-C horizontal hold; Stabilized vertical hold; Two stages of video amplification; Noise saturation circuits; Three stage sync separator and clipper; Four mc. band width for picture channel, and Reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 6⅜" x 8½"—2" radius at corner

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 300 kc on channel 1, and plus and minus approximately 750 kc on channel 13.

POWER SUPPLY RATING

KCS 20A	115 volts, 60 cycles, 320 watts
KCS 20C-2	115 volts, 50 cycles, 320 watts

AUDIO POWER OUTPUT RATING

Undistorted	2.5 watts
Maximum	4 watts

LOUDSPEAKER (970121-1)

Type	5 inch Electro Magnet Dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet	85 lbs.
Shipping Weight	98 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE..300 ohms balanced

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (Outside)	26	14½	19
Chassis Base (Outside)	19¼	3¾	15½
Chassis Overall	21¾	11¾	16⅛

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6BA6	2nd Sound I-F Amplifier
(6)	RCA 6AU6	3rd Sound I-F Amplifier
(7)	RCA 6AL5	Sound Discriminator
(8)	RCA 6AT6	1st Audio Amplifier
(9)	RCA 6K6GT	Audio Output
(10)	RCA 6AG5	1st Picture I-F Amplifier
(11)	RCA 6AG5	2nd Picture I-F Amplifier
(12)	RCA 6AG5	3rd Picture I-F Amplifier
(13)	RCA 6AG5	4th Picture I-F Amplifier
(14)	RCA 6AL5	Picture 2nd Detector and D-C Restorer
(15)	RCA 6AU6	1st Video Amplifier
(16)	RCA 6K6GT	2nd Video Amplifier
(17)	RCA 6SK7	1st Sync Amplifier
(18)	RCA 6SH7	Sync Separator
(19)	RCA 6SN7GT	2nd Sync Amplifier and Horizontal Discharge
(20)	RCA 6J5	Vertical Sweep Oscillator and Discharge
(21)	RCA 6K6GT	Vertical Sweep Output
(22)	RCA 6AL5	Horizontal Sync Discriminator
(23)	RCA 6K6GT	Horizontal Sweep Oscillator
(24)	RCA 6AC7	Horizontal Sweep Oscillator Control
(25)	RCA 6BG6G	Horizontal Sweep Output
(26)	RCA 5V4G	Horizontal Reaction Scanning
(27)	RCA 1B3-GT/8016	High Voltage Rectifier
(28)	RCA 5U4G	Power Supply Rectifiers (2 tubes)
(29)	RCA 10BP4	Kinescope

Specifications continued on page 2

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 Mc.
Adjacent Channel Sound Trap	27.25 Mc.
Accompanying Sound Traps	21.25 Mc.
Adjacent Channel Picture Carrier Trap	19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 Mc.
Sound Discriminator Band Width (between peaks)	350 kc

VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture Sound Volume and On-Off Switch	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Brightness	Single Control Knob

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustment
Height	rear chassis adjustment
Horizontal Linearity	top chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis adjustment
Horizontal Oscillator Frequency	rear chassis adjustment
Horizontal Oscillator Phase	bottom chassis adjustment
Focus	rear chassis adjustment
Focus Coil	top chassis wing nut adjustment
Ion Trap Magnet Coil	top chassis thumb screw adjustment
Deflection Coil	top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on Kinescope Installation. All RCA Kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

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RECEIVER OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

2. Set the STATION SELECTOR to the desired channel.

3. Turn the PICTURE control fully counterclockwise.

4. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen then counterclockwise until the glow just disappears.

5. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.

6. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

7. Adjust the VERTICAL hold control until the pattern stops vertical movement.

8. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

9. Adjust the PICTURE control for suitable picture contrast.

10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

11. In switching from one station to another, it may be necessary to repeat steps number 6 and 9.

12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 6 is generally sufficient.

13. If the position of the controls has been changed, it may be necessary to repeat steps number 1 through 9.

NOTE: If any difficulty is experienced with steps number 7 or 8, turn the PICTURE control ¼ turn counterclockwise and repeat those adjustments.

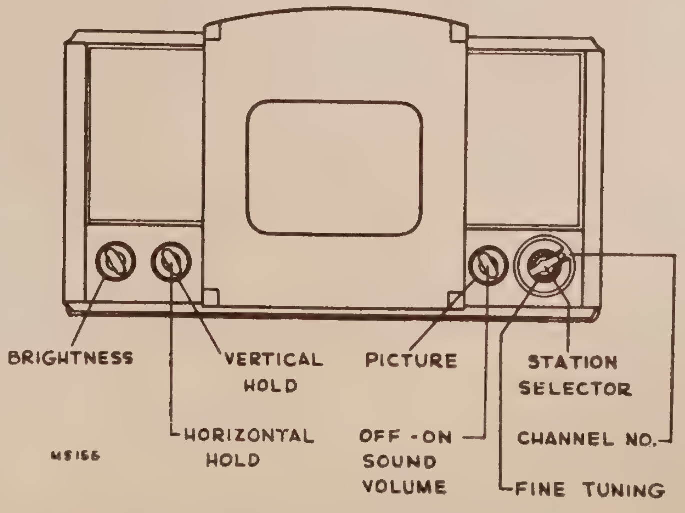


Figure 1—Receiver Operating Controls

CIRCUIT DESCRIPTION

It is advisable that the reader be familiar with a recent standard textbook of television principles in order to properly understand the receiver circuits and their functions. Such a knowledge is assumed for the purpose of this publication. The discussions which follow will not dwell on the operation of conventional circuits used which have been used in previous receivers and which should be well known. In general, the circuits discussed will be only those that are new to the field.

For ease of understanding the basic operation of the receiver, a 15 unit block diagram of it is shown in Figure 2. The circuit description will follow the numerical order of these blocks in order to logically follow a signal through the set.

R-F UNIT (block # 1)—The r-f unit is a separate subchassis of the receiver. On this subchassis are the r-f amplifier, converter, oscillator, fine tuning control, channel switch, converter transformer, r-f, converter and oscillator coils and all their tuning adjustments. The unit provides operation on all thirteen of the present television channels. It functions to select the desired picture and sound carriers, amplifies and converts to provide at the converter plate, a picture i-f carrier frequency of 25.75 mc. and a sound i-f carrier of 21.25 mc.

R-F Amplifier—Referring to the Schematic Diagram (page 42), T1 is a center tapped coil used for the short circuiting of low frequency signals picked up by the antenna which would otherwise be directly applied to the control grids of the 6J6 r-f amplifier, V1. C1 and C2 are antenna isolating capacitors. The d-c return for the grids of V1 is through R3 and R13 which also properly terminate the 300 ohm antenna transmission line. C3 and C4 are neutralizing capacitors necessary to counteract the grid to plate capacitance of the triode r-f amplifier.

In the plate circuit of the r-f amplifier are a series of inductances L1 to L25 and L2 to L26 inclusive. These inductances may be considered as a quarter wave section of a balanced transmission line which can be tuned over a band of frequencies by moving a shorting bar along the parallel conductors.

Adjustable coils L25 and L26 provide the correct length of line for the thirteenth channel, 210—216 mc. L13 to L23 and L14 to L24 are fixed sections of line which are added to L25 and L26 as the shorting bar is moved progressively down the line. The physical construction of each one of these inductances is a small non-adjustable silver strap between the switch contacts. Each strap is cut to represent a six-megacycle change

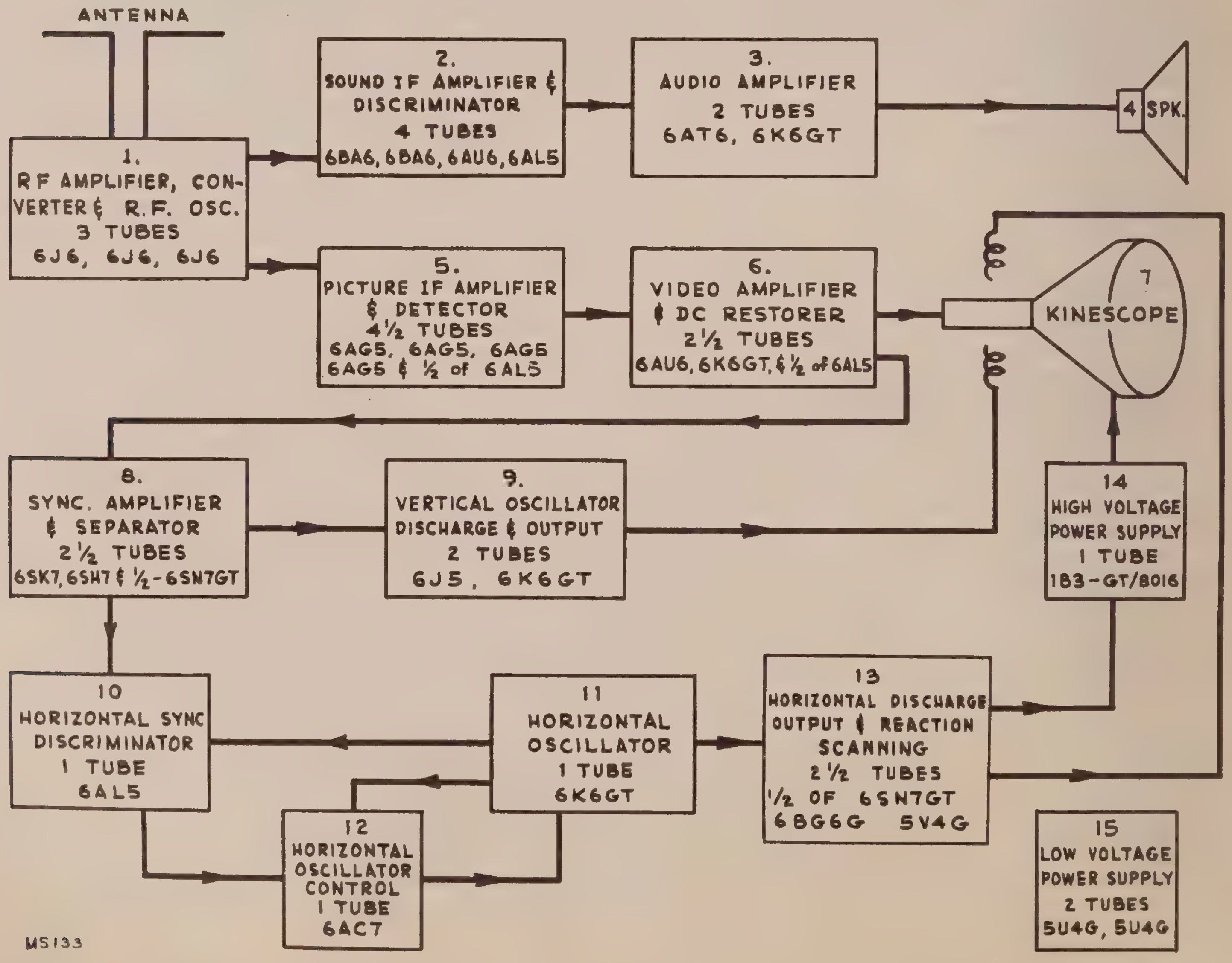

ANTENNA
1. RF AMPLIFIER, CONVERTER & R.F. OSC. 3 TUBES 6J6, 6J6, 6J6
2. SOUND IF AMPLIFIER & DISCRIMINATOR 4 TUBES 6BA6, 6BA6, 6AU6, 6AL5
3. AUDIO AMPLIFIER 2 TUBES 6AT6, 6K6GT
4 SPK.
5. PICTURE IF AMPLIFIER & DETECTOR 4½ TUBES 6AG5, 6AG5, 6AG5 6AG5 & ½ of 6AL5
6. VIDEO AMPLIFIER & DC RESTORER 2½ TUBES 6AU6, 6K6GT, & ½ of 6AL5
7 KINESCOPE
8. SYNC. AMPLIFIER & SEPARATOR 2½ TUBES 6SK7, 6SH7 & ½-6SN7GT
9. VERTICAL OSCILLATOR DISCHARGE & OUTPUT 2 TUBES 6J5, 6K6GT
14 HIGH VOLTAGE POWER SUPPLY 1 TUBE 1B3-GT/8016
10 HORIZONTAL SYNC DISCRIMINATOR 1 TUBE 6AL5
11 HORIZONTAL OSCILLATOR 1 TUBE 6K6GT
12 HORIZONTAL OSCILLATOR CONTROL 1 TUBE 6AC7
13 HORIZONTAL DISCHARGE OUTPUT & REACTION SCANNING 2½ TUBES ½ OF 6SN7GT 6BG6G 5V4G
15 LOW VOLTAGE POWER SUPPLY 2 TUBES 5U4G, 5U4G
MS133

Figure 2—Receiver Block Diagram

in frequency. In order to make the jump between the lowest high frequency channel (174-180 mc) and the highest low frequency channel (82-88 mc), adjustable coils L11 and L12 are inserted. To provide for the remaining five low frequency channels, L1 to L9 and L2 to L10 are progressively switched in to add the necessary additional inductance.

Coils L1 to L9 and L2 to L10 are unusual in that they are wound in figure 8 fashion on fingers protruding from the switch wafer. This winding form produces a relatively non-critical coil since the coupling between turns is minimized. A maximum amount of wire is used for the small inductance which is required, thus permitting greater accuracy in manufacturing.

Converter—The converter grid line operates in a similar manner and is so arranged on the switch to provide coupling between it and the r-f line. C10, C12, C13 and a link, provide additional coupling which is arranged to produce at least a 4.5 megacycle band pass on each of the channels.

L80 and C14 form a series resonant circuit used to prevent i-f feedback in the converter by grounding its grids for i-f frequency. They also act as a trap to reject short-wave signals of i-f frequency which arrive at the converter grids in a push push manner.

A 6J6 twin triode is used as converter. Since the grids are fed in push pull by both the signal and the oscillator, the heterodyne products (i-f signals) are in phase on the converter plates so the two plates are connected in parallel. Unwanted signals of i-f frequency that arrive at the converter grid in a push pull manner are out of phase on the converter plates. Since the plates are tied together, these signals tend to cancel thus reducing the possibility of interference from this source.

R-F Oscillator—The oscillator line is similar except that trimmer adjustments are provided for each channel and the low frequency coils are not figure 8 windings. For tuning each channel, brass screws are used in close proximity to the high frequency tuning straps L66 to L76, and brass cores are adjusted through coils L54 to L62. It is obvious that the high frequency adjustments should be made before each lower frequency one.

C15 is a fine tuning adjustment which provides approximately plus or minus 300 kc. variation of oscillator frequency on channel 1 and approximately plus or minus 750 kc. on channel 13. On a few early production units, slightly less range is available.

The physical location of the oscillator line with respect to the converter grid line is such as to provide some coupling to the converter grids. This coupling is augmented by the link shown on the schematic and provides a reasonably uniform oscillator voltage at the converter grids over the entire tuning range of the unit.

The converter transformer T2 is a combination picture i-f transformer, sound trap, and sound i-f transformer. The converter plate coil is assembled within the structure of a high Q resonant circuit tuned to the sound i-f frequency. This high Q coil absorbs the sound i-f component from the primary. Thus on the T2 primary (from which the picture i-f is fed), the sound carrier is attenuated with relation to the picture channel.

SOUND I-F AMPLIFIER AND DISCRIMINATOR (block #2)—A portion of the energy absorbed by the T2 trap circuit is fed to the first sound i-f amplifier. Three stages of amplification are used to provide adequate sensitivity. A conventional discriminator is used to demodulate the signal. The discriminator band width is approximately 350 kc. between peaks.

AUDIO AMPLIFIER AND SPEAKER (block #3 and 4)—The audio amplifier is a conventional system employing a 6AT6 high mu. triode amplifier and a 6K6GT power output tube feeding a 5-inch E.M. dynamic speaker.

PICTURE I-F AMPLIFIER AND DETECTOR (block #5)—The picture i-f amplifier departs considerably from the conventional coupled amplifier. To obtain the necessary wide band characteristic with adequate gain, four stages of i-f amplification are employed. The converter plate and each successive i-f transformer utilizes only one tuned circuit and each is tuned to a different frequency. The effective Q of each coil is fixed by the shunt plate load or grid resistor so that the response product of the total number of stages produces the desired overall response curve. Figure 3 shows the relative gains and selectivities of each coil and the shape of the curve of the quintuple combination.

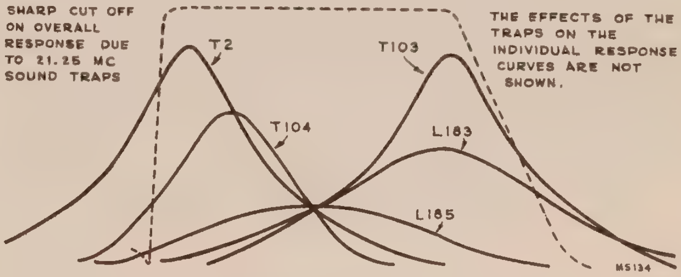


Figure 3—Stagger Tuned I-F Response

In order to obtain this band pass characteristic, the picture i-f transformers are tuned as follows:

Converter transformer	21.8 mc. (T2 primary)
First pix i-f transformer	25.3 mc. (T103 primary)
Second pix i-f transformer	22.3 mc (T104 primary)
Third pix i-f coil	25.2 mc. (L183)
Fourth pix i-f coil	23.4 mc. (L185)

In such a stagger tuned system variations of individual i-f amplifier tube gain do not affect the shape of the overall i-f response curve if the Q and center frequency of the stages remain unchanged. This means that the i-f amplifier tubes are non-critical in replacement because variations in Gm do not affect response shape.

To align the i-f system, the transformers are peaked to the specified frequencies with a signal generator. The overall i-f response is then observed by use of a sweep generator and oscilloscope. Slight deviations from standard circuit Q are compensated for with slight shifts in transformer center frequency until the desired response curve is obtained. If this response cannot be obtained, the difficulty is likely to be in a location that affects either the frequency or Q of one or more of the i-f transformers.

The response curve does shift slightly as the picture control is varied due to the Miller effect. This effect is the change in tube input capacitance as its gain is varied by grid bias changes. The change of input capacitance causes a slight detuning of the preceding i-f transformer and a small shift in response shape. This effect is slight, however, and when the receiver is aligned with the specified grid bias, no difficulty from this source should be encountered.

For familiarization with the frequencies which are important in the receiver's operation, Figure 4 shows the relative position of the picture and sound carriers for channels 2, 3 and 4. If a station on channel 3 is transmitting a picture with video frequencies up to 4 mc., the picture carrier will have side band frequencies up to 65.25 mc. The lower side bands are suppressed at the transmitter.

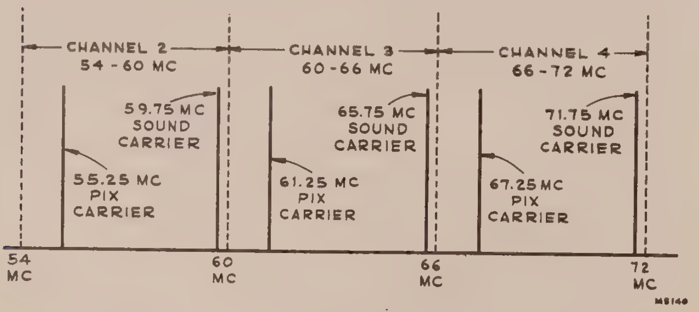


Figure 4—Television Channel Frequencies

With the receiver r-f oscillator operating at a higher frequency than the received channel, the i-f frequency relation of picture to sound carrier is reversed as shown in Figure 5.

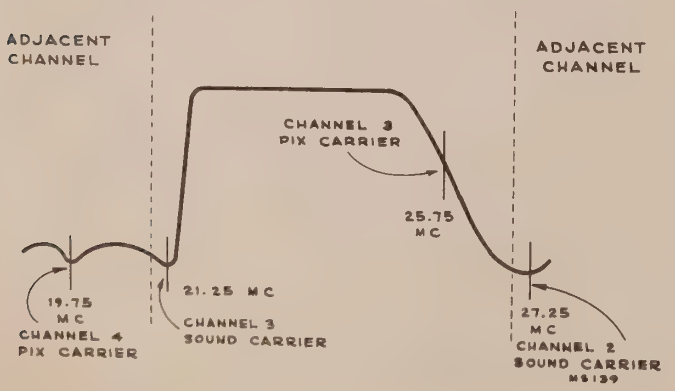


Figure 5—Overall Picture I-F Response

Traps—Since it is necessary for the picture i-f to pass frequencies quite close to the sound carrier frequency, the sound carrier would produce interference in the picture. In order to prevent this interference, traps must be added to the picture i-f amplifier to attenuate the sound carrier. If the receiver should be operating on channel 3, it is possible that interference would be experienced from the channel 2 sound carrier and the channel 4 picture carrier. The adjacent channel traps are provided to attenuate these unwanted frequencies.

The first three traps are absorption circuits. The first trap (T2 secondary) is tuned to the accompanying sound i-f frequency, the second trap (T103 secondary) is tuned to the adjacent channel sound frequency, and the third trap (T104 secondary) tuned to the adjacent channel picture carrier frequency. The fourth trap (T105 secondary) is in the cathode circuit of the fourth picture i-f amplifier V113 and is tuned to the accompanying sound carrier i-f frequency. The primary of T105 in series with C181 forms a series resonant circuit at the frequency to which L185 is tuned (23.4 mc.). This provides a low impedance in the cathode circuit at this frequency and permits the tube to operate with a gain. However, at the resonant frequency of the secondary (21.25 mc.), a high impedance is reflected into the cathode circuit, and the gain of the tube for this frequency is reduced by degeneration. The rejection with this circuit is limited to the gain of the tube.

Picture Second Detector—The detector is a conventional half wave rectifier connected to produce a video signal of the proper polarity.

Picture Control—The picture (or contrast) control varies the bias on the r-f amplifier and the first, second and third i-f amplifier control grids. It is a manual sensitivity control, and is operated to prevent overloading of the i-f stages and to provide the correct video output level from the second detector. A novel arrangement is used in conjunction with the control. The object of this system is to provide optimum signal to noise ratio from the receiver. This is achieved by allowing the r-f amplifier to run essentially at full gain over a considerable range of the picture control. The gain in the r-f stage is reduced only when it becomes necessary to do so in order to prevent overloading of the first i-f stage. The circuit shown in Figure 6 is used to provide the non-proportional r-f and i-f bias from a single control.

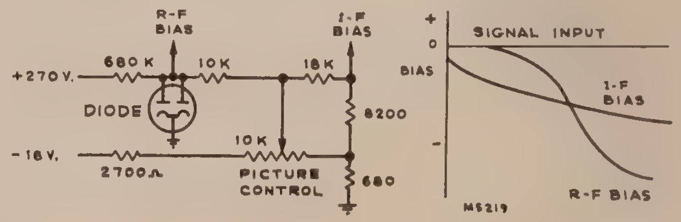


Figure 6—Picture Control Circuit

When the picture control is in the maximum gain position, the i-f bias is approximately minus one volt. The r-f bias is taken from a tap up the control network which would be several volts positive except for relatively heavy conduction of the diode. Diode conduction holds the voltage at this point to approximately ground potential.

As the picture control gain setting is reduced slightly, the i-f bias begins to go more negative. At the r-f bias junction, diode conduction is reduced but the voltage remains essentially constant. When the picture control setting is reduced still further, diode conduction is stopped and the r-f bias voltage changes rapidly to assume a more negative potential than the i-f grid.

This high value of bias on the r-f amplifier is necessary to reduce the triode nearly to cut-off. Although triodes are not generally considered to be remote cut-off tubes, sufficient curvature is present in the grid control characteristic to provide approximately a ten to one reduction in gain when the bias approaches the cut-off point.

VIDEO AMPLIFIER AND D-C RESTORER (block #6)—The function of this section of the receiver is to amplify the video output of the second detector. Two amplifier stages are employed. The gain from the first video grid to output plate is 30X and the frequency response extends to 4 mc.

Noise Saturation Circuit—Since the synchronizing pulse is "blacker than black" and "black" information must drive the Kinescope grid toward cut-off, this means that the video signal polarity must be such that the sync is negative when applied to the Kinescope grid. It is obvious that for the two-stage video amplifier as is used, the sync pulse from the second detector must also be negative at the first video amplifier grid. The first stage is designed so that with a normal signal input level at its grid, the tube will be working over most of its operating range. Any large noise signal above sync will drive the grid to cut-off and the noise will be limited. In effect, the signal to noise ratio is thus improved.

D-C Restorer—Since the video amplifier is an a-c amplifier, the d-c component of the video signal that represents the average illumination of the original scene will not be passed. Unless this d-c component is restored, difficulty will be experienced in maintaining proper scene illumination. For any given scene, this average illumination could be set properly by the brightness control. However, a change of scene would probably necessitate resetting this control. The d-c restorer accomplishes this setting automatically thus assuring proper picture illumination at all times. For a detailed explanation of the operation of the d-c restorer, see "Practical Television by RCA."

KINESCOPE (block #7)—The Kinescope is a 10" tube employing a new type screen material which provides considerably improved picture brilliance. The tube employs magnetic deflection and magnetic focus. An ion trap is employed to prevent the ion beam from producing a brown spot on the picture screen. The inside and outside of the flaring portion of the bulb are given a metallic coating. The inner coating, which is the second anode, is connected to the high voltage supply. The outer coating is grounded by means of two small springs on the deflection yoke support. The capacity between the two coatings is approximately 500 mmf and is used as a high voltage filter condenser.

SYNC AMPLIFIER AND SEPARATOR (block #8)—The function of this system is to amplify the sync signal and effect separation of sync from the video.

Sync Amplifier—The first sync amplifier V118 is a 6SK7 which has a remote cut-off characteristic. The signal from the d-c restorer is fed into this amplifier with the polarity such that the sync is in the negative direction. Noise pulses above sync that remain after the limiting action of the first video grid are thus further compressed and the sync to noise ratio is again improved.

Sync Separator—The sync at the sync separator grid is positive in polarity. The operating voltages applied to the grid, screen and plate, are such that the negative portion of the applied signal is cut off. Thus, the video and blanking pulses are removed and only the sync pulses appear at the sync separator plate.

Second Sync Amplifier—The sync pulses appearing at the second sync amplifier, (V120A), grid are negative in polarity and must be inverted before they can be injected into the sweep oscillators. The signal at the V120A grid is sufficient to drive the tube beyond cut-off and the signal is again clipped. This final clipping removes all amplitude variations between sync pulses due to noise, hum, etc., and it appears with the correct polarity at the plate.

Integrating Network—The purpose of this network is to separate the horizontal from the vertical sync and to pass the vertical to the vertical oscillator.

Since the horizontal sync pulse is of short duration (5 microseconds) and the vertical pulse is of much longer duration (190 microseconds), they can be separated by an r-c filter which is responsive to wave shape. The integrating network which is such a filter is composed of R163, R164, R165, C151, C152 and C153. In operation it can be considered as a low-pass filter which by-passes the narrow or high frequency horizontal sync but passes the broad or low frequency vertical sync.

VERTICAL OSCILLATOR DISCHARGE AND OUTPUT (block #9)—The function of these circuits is to provide a sawtooth of current of the proper frequency and phase to perform the vertical scanning for the Kinescope. To produce such a current in the vertical deflection coil, a somewhat different shaped voltage wave is required.

Since the vertical trace is slow, requiring approximately 16,000 microseconds, and the vertical deflection coil inductance is small, approximately 50 millihenries, the majority of the voltage across the coil during trace is across its resistive component. In order to produce a linear change of current through a resistance, a linear change of voltage is necessary. Retrace, however, must be accomplished within the 666 microsecond vertical blanking time and therefore requires a much faster rate of change of current through the coil. During this time, the effect of its inductance becomes appreciable because of the required fast rate of change of current. It is therefore necessary to apply a large pulse of voltage across the coil in order to obtain rapid retrace. The composite waveform required to produce a sawtooth of current in the coil is a sawtooth of voltage with a sharp pulse as shown in Figure 7. V121 and V122 supply such a voltage.

Vertical Oscillator and Discharge—A single 6J5 triode, V121, with its associated components form a blocking oscillator and discharge circuit. The wave form of the voltage at the control grid of this tube with respect to time, is a small, positive surge followed by a large negative drop which returns to the positive condition at a relatively slow rate. During the negative part of the cycle, the grid is beyond cut-off and the discharge capacitor, C158, charges through resistors R169 and R170. When the grid reaches a voltage that permits plate to cathode conduction, C158 discharges through T106 secondary and V121. The discharge current of C158 builds up a magnetic field in T106 that in turn induces a positive voltage at the grid of V121. This positive voltage on the V121 grid lowers the plate resistance of the tube and allows C158 to discharge more rapidly. This process builds up very rapidly until C158 is nearly discharged. The magnetic field in T106 then collapses and drives the V121 grid negative. The charge placed on C154 due to grid conduction during the positive pulse now holds the grid negative. As the charge on C154 leaks off through R171, R172, etc., the grid slowly becomes less negative and approaches the point which will allow plate to cathode conduction. Just before the conduction point is reached, the 60 cycle vertical synchronizing pulse from the integrating network is applied to the V121 grid. This pulse is sufficient to drive the tube to conduction and the process is repeated. In this manner, the incoming sync maintains control of vertical scanning.

On the plate of V121, a sawtooth of voltage appears due to the slow charging and rapid discharging of C158. A sharp negative pulse also occurs during the discharge period. See Figure 7. This pulse appears because of the action of R174 and C158, an action which is known as peaking. When V121 is conducting, the plate voltage drops nearly to cathode potential. C158 discharges during this time. However, since the conduction time is short, C158 cannot be completely discharged due to the time constant of R174 in series with C158. When V121 becomes non-conducting, the plate voltage does not have to rise slowly from cathode potential but instead rises immediately to an appreciable value due to the charge that remains on C158. The plate voltage then slowly rises from this value as C158 charges through R170 and R169. Adjustment of the height control R169 varies the amplitude of the sawtooth voltage on V121 plate by controlling the rate at which C158 can charge.

The voltage present on the V121 plate is of the shape required to produce a sawtooth of current in the vertical deflection coil. It is now necessary to amplify it in a tube capable of supplying a sufficient amount of power.

Vertical Output—A 6K6GT is connected as a triode for the output stage, V122. The vertical output transformer T107 matches the resistance of the vertical deflection coils to the plate impedance of the 6K6GT

R178 is provided as a vertical sweep linearity control. Since the grid control characteristic curve of V122 is not a straight line over its entire range, the effect of adjustments of R178 is to produce slight variations in shape of the sawtooth by shifting the operating point of the tube to different points along the curve.

Since the slope of the curve varies at these different points and thus varies the effective gain of the tube, it is apparent that adjustments of linearity effect picture height and that such adjustments must be accompanied by readjustments of the height control R169. Adjustments of the height control affect the shape of the sawtooth voltage on V121 plate so that adjustments of height must be accompanied by readjustments of linearity.

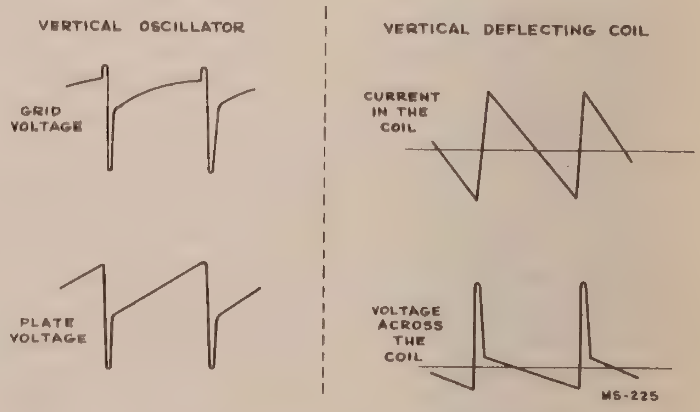


Figure 7—Vertical Sweep Waveforms

HORIZONTAL SYNC DISCRIMINATOR, HORIZONTAL OSCILLATOR AND OSCILLATOR CONTROL (block #10, 11 and 12) —These circuits are a radical departure from the conventional systems used for framing the picture in the horizontal direction. Their features are ease of operation, stability and good noise immunity.

HORIZONTAL OSCILLATOR (block #11)—The horizontal oscillator is an extremely stable Hartley oscillator operating at the scanning frequency 15,750 cps. The primary of T108 (terminals A, B and C) is the oscillator coil. This coil is closely coupled to the secondary winding (terminals D, E and F) and thus feeds a sine wave voltage to V123.

HORIZONTAL SYNC DISCRIMINATOR (block #10)—The sync discriminator, V123, is a 6AL5 dual diode in a circuit which produces a d-c output voltage proportional to the phase displacement between two input voltages.

The sine wave oscillator voltages applied to the plates of V123 are equal in amplitude and opposite in phase. The synchronizing pulses from the second sync amplifier are fed through a differentiating network to attenuate the vertical sync and then applied to the center tap of T108. The horizontal sync pulses thus appear in phase and of equal amplitude on the diode plates as shown in Figure 8. When the pulse and sine wave are properly phased as in (A), both diodes will produce equal voltage across their load resistances, R191 and R192. However, these voltages are of opposing polarity and therefore the sum of the voltages across these two load resistors will be zero. If the phase of the pulse changes with respect to the sine wave as in (B), the top diode will produce more voltage across R191 than the bottom diode produces across R192. Thus, the voltage across the two will be positive. In (C) the reverse condition exists. It is obvious that the output of the discriminator can swing from positive through zero to negative dependent upon the phase relation of the synchronizing signal and the oscillator. This d-c output is applied to the grid of V124.

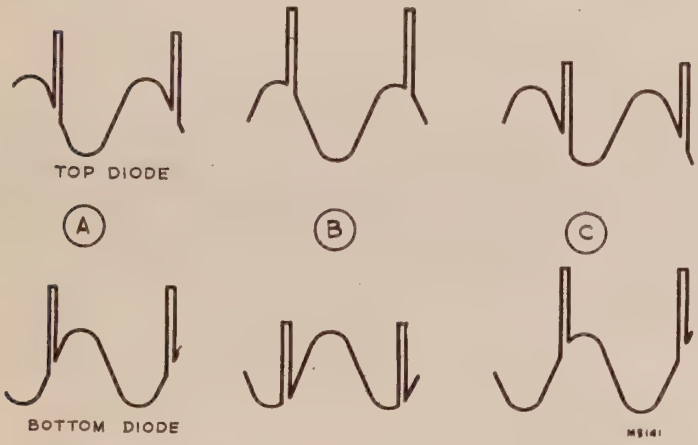


Figure 8—Sync Discriminator Waveforms

HORIZONTAL OSCILLATOR CONTROL (block # 12)—V124 the oscillator control is a 6AC7 connected as a reactance tube across the V125 oscillator coil. A change in the d-c output of the discriminator produces a change in Gm of V124 which in turn changes the frequency of the oscillator. If the phase of the oscillator shifts with respect to the synchronizing pulse, the corresponding change in d-c from the discriminator brings the oscillator back into correct phase. C167 and C170 form a voltage divider to attenuate rapid changes in d-c from the sync discriminator such as are produced by vertical sync or bursts of noise.

Sync Link—If any phase modulation is present in the transmitted sync, a condition which unfortunately still exists in some transmitters to date, a faster response to fluctuations in the sync phase is needed than is provided by the ratio of C167 to C170.

The sync discriminator will demodulate sync phase variation quite faithfully, however, the filter resistor R193 together with the capacity attenuator, C167 and C170 is just as effective in removing this information as it is with respect to the noise disturbances for which it is intended. The removal of this information will produce a horizontal displacement of portions of the picture.

It may be necessary in some instances to sacrifice some noise immunity to compensate for phase modulation in the transmitted sync. By switching the link provided for this purpose, C171 is added across C167 and the speed of response is increased by several times. Therefore, the link of J102 should be connected between terminals 1 and 2 whenever this condition exists.

Before making this change, however, it should first be definitely determined that distortion of the raster is due to phase modulation of the sync. Horizontal "jitter" and distortion of the raster can be caused by operating the picture control at too great a gain setting considering the r-f signal input. Such a setting produces an excessive video signal at the first video amplifier grid. This stage is designed to limit an excessive input in order to improve the signal to noise ratio. If the video input is excessive, the sync is limited and thus removed. At the same time, picture information may be introduced into the sync circuits which may make their operation unstable. With extreme excesses of video level, both horizontal and vertical sync may be lost. If the receiver operating instructions on page 3 are followed, no difficulty should be experienced with the picture control setting.

In late production receivers the link has been removed from the oscillator control circuit leaving it in link from 2 to 3 condition. To check the connection of the link board, tune in a picture and place the finger on terminal 3. If the picture is displaced horizontally the board is connected to the oscillator control circuit. If no such pulling is observed, it indicates that that receiver is connected to employ the board for a video peaking link.

HORIZONTAL DISCHARGE OUTPUT AND REACTION SCANNING (block # 13)—The purpose of these circuits is to produce a sawtooth of current in the deflection coils to provide horizontal scanning for the Kinescope.

Horizontal Discharge—One-half of a 6SN7GT is employed for the discharge tube V120B. The function of this stage is to produce a sawtooth voltage for use in the horizontal sweep circuits.

The oscillation in V125 takes place between screen-grid and cathode. Since the peak to peak voltage on its grid is approximately 95 volts, a square wave is produced on its plate. This wave is differentiated by C176 and R202, and the pulse so obtained is applied to the grid of the discharge tube V120B.

The discharge tube is normally cut off due to bias produced by grid rectification of these incoming pulses. The pulse from V125 overcomes this bias and drives the tube into heavy momentary conduction. During this period the plate voltage falls nearly to cathode potential and C179 discharges rapidly. However, since the period of conduction is quite short, C179 is not completely discharged due to the time constant introduced by R187 and R210 in series with C179. Then when V120B again becomes non conducting, the plate voltage rises quickly to a value determined by the charge remaining on C179. From this point the plate voltage rises slowly and approximately linearly as C179 charges through R204.

Horizontal Output and Reaction Scanning—The operation of these two circuits is so interconnected that it will be necessary to discuss them simultaneously. The function of the output tube V126 is to supply sufficient current of the proper wave form to the horizontal deflection coil in order to provide horizontal scanning for the Kinescope. The function of the reaction scanning tube V128 is to stop oscillation of certain components at certain times and thus help provide a linear trace. Other functions of these circuits include the utilization of energy stored in the horizontal deflection coil to furnish retrace and Kinescope high voltage. The reaction scanning circuit also recovers some of the energy from the yoke kickback and uses it to help supply the plate power requirements of the output tube.

In operation, the visible portion of the horizontal trace is approximately 53 microseconds in duration. Although the inductance of the horizontal deflection coil is in the order of 8 millihenries, at the horizontal scanning frequency, the reactance of the coil predominates over its resistance. This is a different case than that encountered in the vertical deflection system and so a different method of operation must be employed.

Horizontal blanking is approximately 10 microseconds in duration. During this time, the Kinescope beam must be returned to the left side of the tube, the trace started and made linear. In order that all this be accomplished within the horizontal blanking time, only 7 microseconds can be allowed for the return trace. In order to obtain such rapid retrace, the horizontal deflection coil, output transformer and associated circuits are designed to resonate at a frequency such that one half cycle of oscillation at this frequency will occur in the 7 microseconds retrace time limit.

During the latter part of the horizontal trace, the output tube conducts very heavily and builds up a strong magnetic field in the deflection coil and output transformer. When the negative pulse from the horizontal tube is applied to the output tube grid, its plate current is suddenly cut off and the magnetic field in the transformer and deflection coil begins to collapse at a rate determined by the resonant frequency of the system. Actually the system is shock excited into oscillation. Since the output tube is cut off and since the voltage generated by the collapsing field is negative on the reaction scanning tube plate so that it is non-conductive, there is essentially no load on the circuit and it oscillates vigorously for one half cycle. If the reaction scanning tube were not present, the circuit would continue to oscillate as shown in Figure 9 (A). This condition, however, is not permitted. One half cycle of oscillation is permitted because at the end of such a time the current in the deflection coil has reached a maximum in the opposite direction to which it was flowing at the end of the trace period. This reversal of the direction of flow of current was the requirement for retrace and it was accomplished in the allotted 7 microseconds.

Now the retrace has been completed, it is necessary to start the next trace. The energy which was placed in the deflection coil by the output tube in the later part of the last trace has not been dissipated. During the one-half cycle of oscillation retrace was accomplished with very little loss of energy. The field in the coil was merely reversed in polarity. So, at this point, a strong field exists in the deflection coil.

As mentioned previously, if the coil were not damped, it would continue to oscillate at its natural frequency as shown in Figure 9 (A). To prevent such an oscillation the reaction scanning tube is brought into action. This tube is in a modified damper circuit which is effectively connected across the deflecting coil.

In the oscillating circuit, the current in the deflection coil lags the voltage by approximately 90 degrees and when the current has reached its maximum negative value, the voltage across the coil being 90 degrees ahead, has begun to swing positive. When the voltage on the reaction scanning tube plate becomes positive with respect to its cathode, it begins to conduct heavily. This places such a load across the deflection coil that it cannot oscillate. Instead the field begins to decay at a rate permitted by the load which the reaction scanning tube placed on the coil. The circuit constants are such that this decay is linear and at a rate suitable for the visible trace.

If no additional energy were fed into the coil, the field would fall to zero and the Kinescope beam would come to rest in the center of the tube. In such an r-l circuit, as the current approaches its final value, it does not do so linearly but asymptotically as indicated in Figure 9 (B). It is therefore necessary to have the output tube begin to supply power to the deflection coil before the energy in the coil is completely dissipated. Figure 9 (C) shows the shape of the current supplied by the output tube. Although the currents supplied by the output tube and by the decaying field are curved at the cross over point, together they produce a coil current that is linear.

By the time the beam has reached the right side of the Kinescope, the output tube is conducting heavily and has built up a strong field in the transformer and coil. At this point, the output tube is again suddenly cut off and the process is repeated.

The 6BG6G plate voltage is supplied through the 5V4G which is conducting over the major portion of the trace. Capacitors C186 and C188 are charged during this period and this charge is sufficient to supply the 6BG6G plate when the 5V4G is not conducting.

The charge is placed on these capacitors by the receiver d-c supply and by the current from the collapse of the field in the horizontal deflecting coil. The a-c axis of the sweep voltage is 275 volts above ground since the T109 secondary is connected to the receiver 275 volt bus. The charge placed on these capacitors by the coil kick-back is therefore in addition to that from the d-c supply and thus the capacitors are charged to a voltage greater than the d-c supply. This permits operation of the 6BG6G at a higher voltage than is obtainable from the receiver power supply and produces an increase in the system efficiency by salvaging energy that would otherwise have been wasted.

During the trace period, the voltage across C186 varies due to the charging by the deflection coil kickback and discharging throughout the output tube. This rise and fall of voltage constitutes an a-c "ripple" in the plate supply of the output tube. By shifting the phase of this ripple with respect to the tube plate current requirements, slight variations of plate characteristics are obtained. L201 and C188 constitute a phase shifting network. L201 is variable and is provided to effect small improvements in linearity. Counterclockwise rotation of the adjustment screw causes the second quarter of the picture to stretch and the first quarter to crowd.

R187, the horizontal drive control, determines the ratio of high peaking and sawtooth voltage on the grid of the output tube and thus affects the point on the trace at which the tube conducts. Clockwise rotation of control increases picture width, crowds the right side of the picture and stretches the left side. L196 is provided to vary the output and hence the picture width by shunting a portion of the T109 secondary winding. Clockwise rotation of the adjustment increases the picture width and causes the right side of the picture to stretch slightly.

R209 is a damping resistor inserted to control trace linearity on the left side of the picture. A high and low tap is provided on this resistor by which variations in the yoke and output transformer can be compensated for. This tap is set in the factory and probably will not have to be changed in the field.

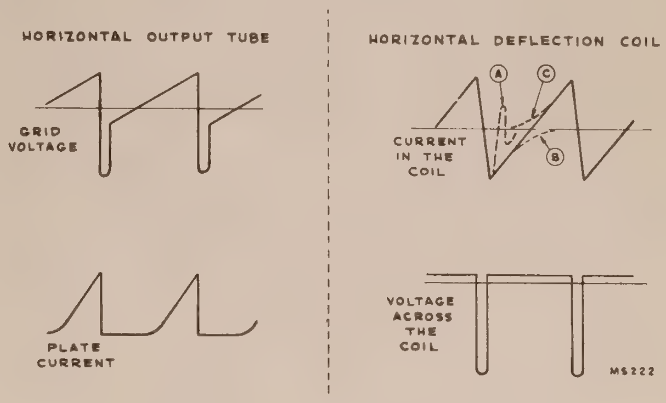


Figure 9—Horizontal Sweep Waveforms

HIGH VOLTAGE POWER SUPPLY (block # 14)—The Kinescope high voltage supply is unusual in that the power is obtained from the energy stored in the deflection inductances during each horizontal scan. When the 6BG6G plate current is cut off by the incoming signal, a positive pulse appears on the T109 primary due to the collapsing field in the deflection coil. This pulse of voltage is stepped up, rectified, filtered and applied to the second anode of the kinescope. Since the frequency of the supply voltage is high, (15,750 cps), relatively little filter capacity is necessary. Since the filter capacity is small, the stored energy is small, and the high voltage supply is made less dangerous.

LOW VOLTAGE POWER SUPPLY (block # 15)—The low voltage power supply provides the filament and plate voltages for the receiver. The unit is conventional, and employs two 5U4G rectifier tubes in parallel to supply 400 volts d-c at approximately 290 ma. The speaker field is used as filter choke for all but the sound output tube which uses an r-c filter.

Antenna Wave Trap:

In some instances interference may be encountered from FM stations that are on the image frequency of a television station. In other instances interference between two television stations may be observed.

Assume that two television stations in a city are operating on channels 6 and 10. When the receiver is tuned to channel 6, a small amount of the oscillator voltage (109 mc.) is present on the r-f amplifier grid. This 109 mc. voltage beats with the channel 10 picture carrier and produces an 84.25 mc. signal. This signal falls within the channel 6 range and interferes with the reception of channel 6. A similar case occurs between channels 5 and 7.

A series resonant trap across the r-f amplifier grid circuit will remove the oscillator voltage from the grids and will minimize this type of interference. Such a trap was installed on those receives which experienced this type of interference.

To adjust the trap, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. Keep both cores approximately equal. Turn one core ½ turn from the original position, then readjust the second core for minimum interference in the picture. Repeat until the best rejection is obtained. For shop alignment the cores of this trap should be run out before proceeding with r-f and converter line adjustment. After the receiver alignment is completed, the trap should be retuned.

Refer to page 227 (621TS, page 29) for schematic and wiring of antenna trap.

630TS

CHASSIS TOP VIEW

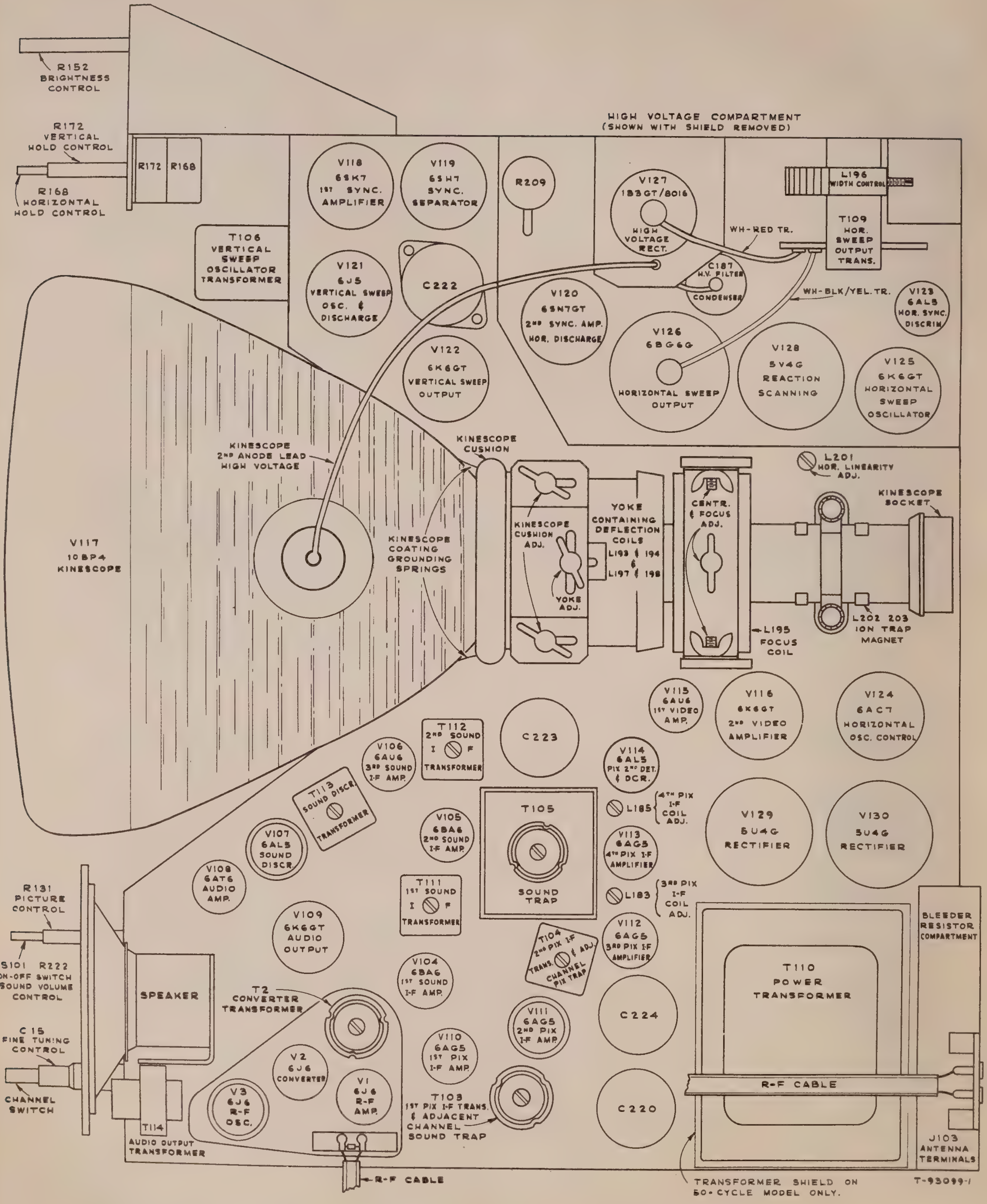

R152
BRIGHTNESS
CONTROL
R172
VERTICAL
HOLD CONTROL
R168
HORIZONTAL
HOLD CONTROL
R172
R168
T106
VERTICAL
SWEEP
OSCILLATOR
TRANSFORMER
V118
6SK7
1ST SYNC.
AMPLIFIER
V119
6SH7
SYNC.
SEPARATOR
R209
HIGH VOLTAGE COMPARTMENT
(SHOWN WITH SHIELD REMOVED)
V127
1B3GT/8016
HIGH
VOLTAGE
RECT.
L196
WIDTH CONTROL
T109
HOR.
SWEEP
OUTPUT
TRANS.
WH-RED TR.
C187
H.V. FILTER
CONDENSER
WH-BLK/YEL.TR.
V121
6J5
VERTICAL SWEEP
OSC. & DISCHARGE
C222
V120
6SN7GT
2ND SYNC. AMP.
HOR. DISCHARGE
V123
6AL5
HOR. SYNC.
DISCRIM.
V126
6BG6G
HORIZONTAL SWEEP
OUTPUT
V128
5V4G
REACTION
SCANNING
V125
6K6GT
HORIZONTAL
SWEEP
OSCILLATOR
V122
6K6GT
VERTICAL SWEEP
OUTPUT
KINESCOPE
2ND ANODE LEAD
HIGH VOLTAGE
KINESCOPE
CUSHION
L201
HOR. LINEARITY
ADJ.
KINESCOPE
SOCKET
V117
10BP4
KINESCOPE
KINESCOPE
COATING
GROUNDING
SPRINGS
KINESCOPE
CUSHION
ADJ.
YOKE
CONTAINING
DEFLECTION
COILS
L193 & 194
&
L197 & 198
YOKE
ADJ.
CENTR.
& FOCUS
ADJ.
L195
FOCUS
COIL
L202 203
ION TRAP
MAGNET
V115
6AU6
1ST VIDEO
AMP.
V116
6K6GT
2ND VIDEO
AMPLIFIER
V124
6AC7
HORIZONTAL
OSC. CONTROL
T112
2ND SOUND
I F
TRANSFORMER
C223
V106
6AU6
3RD SOUND
I-F AMP.
V114
6AL5
PIX 2ND DET.
& DCR.
T113
SOUND DISCR.
TRANSFORMER
L185
4TH PIX
I-F
COIL
ADJ.
T105
V129
5U4G
RECTIFIER
V130
5U4G
RECTIFIER
V107
6AL5
SOUND
DISCR.
V105
6BA6
2ND SOUND
I-F AMP.
V113
6AG5
4TH PIX I-F
AMPLIFIER
V108
6AT6
AUDIO
AMP.
T111
1ST SOUND
I F
TRANSFORMER
SOUND
TRAP
L183
3RD PIX
I-F
COIL
ADJ.
R131
PICTURE
CONTROL
BLEEDER
RESISTOR
COMPARTMENT
V109
6K6GT
AUDIO
OUTPUT
T104
2ND PIX I-F
TRANS. & ADJ.
CHANNEL
PIX TRAP
V112
6AG5
3RD PIX I-F
AMPLIFIER
S101 R222
ON-OFF SWITCH
SOUND VOLUME
CONTROL
SPEAKER
V104
6BA6
1ST SOUND
I-F AMP.
T110
POWER
TRANSFORMER
T2
CONVERTER
TRANSFORMER
V111
6AG5
2ND PIX
I-F AMP.
C224
C15
FINE TUNING
CONTROL
V2
6J6
CONVERTER
V110
6AG5
1ST PIX
I-F AMP.
CHANNEL
SWITCH
V3
6J6
R-F
OSC.
V1
6J6
R-F
AMP.
T103
1ST PIX I-F TRANS.
& ADJACENT
CHANNEL
SOUND TRAP
C220
R-F CABLE
T114
AUDIO OUTPUT
TRANSFORMER
J103
ANTENNA
TERMINALS
R-F CABLE
TRANSFORMER SHIELD ON
50-CYCLE MODEL ONLY.
T-93099-1

Figure 10—Chassis Top View

CHASSIS BOTTOM VIEW

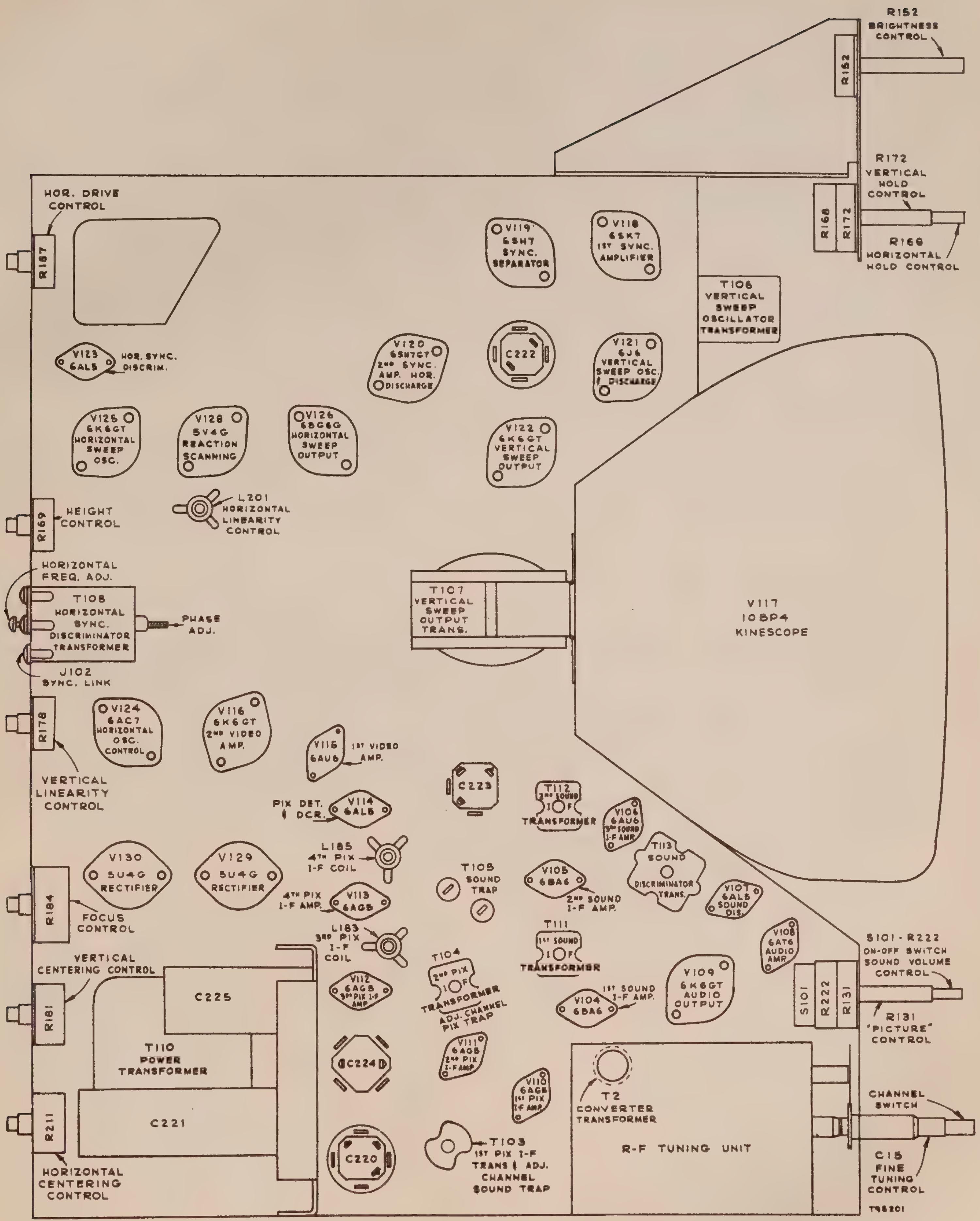

R152
BRIGHTNESS CONTROL
R152
R172
VERTICAL HOLD CONTROL
R168
R172
R168
HORIZONTAL HOLD CONTROL
HOR. DRIVE CONTROL
R187
V119 6SH7 SYNC. SEPARATOR
V118 6SK7 1ST SYNC. AMPLIFIER
T106 VERTICAL SWEEP OSCILLATOR TRANSFORMER
V123 6AL5
HOR. SYNC. DISCRIM.
V120 6SN7GT 2ND SYNC. AMP. HOR. DISCHARGE
C222
V121 6J6 VERTICAL SWEEP OSC. & DISCHARGE
V125 6K6GT HORIZONTAL SWEEP OSC.
V128 5V4G REACTION SCANNING
V126 6BG6G HORIZONTAL SWEEP OUTPUT
V122 6K6GT VERTICAL SWEEP OUTPUT
R169
HEIGHT CONTROL
L201 HORIZONTAL LINEARITY CONTROL
HORIZONTAL FREQ. ADJ.
T108 HORIZONTAL SYNC. DISCRIMINATOR TRANSFORMER
PHASE ADJ.
J102 SYNC. LINK
T107 VERTICAL SWEEP OUTPUT TRANS.
V117 10BP4 KINESCOPE
R178
V124 6AC7 HORIZONTAL OSC. CONTROL
V116 6K6GT 2ND VIDEO AMP.
V115 6AU6
1ST VIDEO AMP.
VERTICAL LINEARITY CONTROL
C223
PIX DET. & DCR.
V114 6AL5
T112 2ND SOUND I F TRANSFORMER
V106 6AU6 3RD SOUND I-F AMP.
L185 4TH PIX I-F COIL
T113 SOUND DISCRIMINATOR TRANS.
V130 5U4G RECTIFIER
V129 5U4G RECTIFIER
T105 SOUND TRAP
V105 6BA6
2ND SOUND I-F AMP.
V107 6AL5 SOUND DIS.
R184
FOCUS CONTROL
4TH PIX I-F AMP.
V113 6AG5
L183 3RD PIX I-F COIL
T111 1ST SOUND I F TRANSFORMER
V108 6AT6 AUDIO AMP.
S101 - R222 ON-OFF SWITCH SOUND VOLUME CONTROL
VERTICAL CENTERING CONTROL
C225
T104 2ND PIX I F TRANSFORMER
ADJ. CHANNEL PIX TRAP
V112 6AG5 3RD PIX I-F AMP
V109 6K6GT AUDIO OUTPUT
V104 6BA6
1ST SOUND I-F AMP.
S101
R222
R131
R131 "PICTURE" CONTROL
R181
T110 POWER TRANSFORMER
C224
V111 6AG5 2ND PIX I-F AMP.
V110 6AG5 1ST PIX I-F AMP.
T2 CONVERTER TRANSFORMER
CHANNEL SWITCH
R211
C221
C220
T103 1ST PIX I-F TRANS & ADJ. CHANNEL SOUND TRAP
R-F TUNING UNIT
C15 FINE TUNING CONTROL
HORIZONTAL CENTERING CONTROL
T96201

Figure 11—Chassis Bottom View

TEST EQUIPMENT—To properly service this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges
 18 to 30 mc., 1 mc. sweep width
 40 to 90 mc., 10 mc. sweep width
 170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least 1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies

19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
21.8 mc. convertor transformer
22.3 mc. second picture i-f transformer
23.4 mc. fourth picture i-f coil
25.2 mc. third picture i-f coil
25.3 mc. first picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) R-F frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output on these ranges should be adjustable and at least 1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

SERVICE PRECAUTIONS—Cutouts in the bottom of the cabinet make it possible to do much of the servicing of the receiver without removing the chassis. If the receiver is serviced in cabinet, a soft pad should be placed under the cabinet when it is inverted, in order to avoid scratching the surface. In manufacture, the cabinet receives a Class 1 rub finish and every effort should be made to preserve that finsh. The receiver handling precaution on page 23 should also be observed.

If necessary to remove the chassis from cabinet, the Kinescope must first be removed. See Figures 22, 24 and 26. If possible, the chassis should then be serviced without the Kinescope. However, if it is necessary to view the raster during servicing, the Kinescope should be inserted only after the chassis is turned on end. The Kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the Kinescope second anode lead. Its short circuit current is approximately 3 ma. This represents approximately 9 watts dissipation and a considerable overload on the high voltage filter resistor R235.

Adjustments Required—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require re-adjustment.

Due to the high frequencies at which the receiver operates, the r-f oscillator line adjustment is critical and may be affected by a tube change. The line can be adjusted to proper frequency on channel 13 with practically any 6J6 tube in the socket. However, it may not then be possible to adjust the line to frequency on all of channels 7, 8, 9, 10, 11 and 12. To be satisfactory as an oscillator tube, it should be possible to adjust the line to proper frequency with the fine tuning control in the middle third of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to completely realign the oscillator line when changing the tube.

Tubes which cannot be used as oscillator will work satisfactorily as r-f amplifier or converter.

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken and the reasons for these precautions. Then, for more convenient reference during alignment, a tabulation of the method is given. All the information necessary for alignment is given in the table, however, alignment by the table should not be attempted before reading the detailed instructions.

ORDER OF ALIGNMENT—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:—

- Picture i-f traps
- Picture i-f transformers
- Sound discriminator
- Sound i-f transformers
- R-F and converter lines
- R-F oscillator line
- Converter grid trap.
- Retouch picture i-f transformers
- Sensitivity check

PICTURE I-F TRAP ADJUSTMENT—

Set the voltage on the i-f bias bus to approximately −3 volts.

Set the channel switch to channel 9.

Connect the "VoltOhmyst" across the picture second detector load resistor R137.

Connect the output of the signal generator to the junction of L80 and R6. This connection is available on a terminal lug through a hole in the side apron of the chassis beside the r-f unit.

Set the generator to each of the following frequencies and tune the specified adjustment for minimum indication on the VoltOhmyst. In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

19.75 mc. T104 (top)
21.25 mc.—T2 (top)
21.25 mc.—T105 (top)
27.25 mc. - T103 (top)

PICTURE I-F TRANSFORMER ADJUSTMENTS

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst."

21.8 mc.—T2 (bottom)
25.3 mc.—T103 (bottom)
22.3 mc.—T104 (bottom)
25.2 mc.—L183 (top of chassis)
23.4 mc. L185 (top of chassis)

If T104 (bottom) required adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

Picture I-F Oscillation If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting.

If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment stud extensions of T2, T103, T104, T105, L183, and L185 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias with the picture control. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three i-f amplifiers to ground with 1000 mmf. capacitors.

Connect the signal generator to the fourth i-f grid and adjust L185 to frequency.

Remove the shunting capacitor from the third i-f grid, connect the signal generator to this grid and align L183.

Remove the shunting capacitor from the second i-f grid, connect the signal generator and align T104.

Remove the shunting capacitor from the first i-f grid, connect the signal generator and align T103.

Connect the signal generator to the junction of L80 and R6, and align T2 to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

SOUND DISCRIMINATOR ALIGNMENT—

Set the signal generator for approximately 1 volt output at 21.25 mc. and connect it to the third sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R219 and R220. Do not remove the discriminator shield to make connections to R219 and R220. Connection can be easily made by fashioning a hook on the 1 meg resistor lead and making connection to the transformer lug "C" through the hole provided for the adjusting tool.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R236 and C205.

Adjust T113 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T113 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the third sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 and with an output of approximately 1 volt.

Connect the oscilloscope between R236 and C205.

The pattern obtained should be similar to that shown in Figure 18A. If it is not, adjust the T113 (top) until the wave form is symmetrical.

The peak to peak bandwidth of the discriminator should be approximately 350 kc. and it should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT—

Connect the sweep oscillator to the second sound i-f amplifier grid.

Connect the oscilloscope to the third sound i-f grid return (terminal A T112) in series with a 33,000 ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the second sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 18B.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the third sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values, otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the sweep and signal generator to the top end of the trap winding of T2 (on top of the chassis). Adjust T111 (top and bottom), for maximum gain and symmetry at 21.25 mc.

Reduce the sweep output for the final adjustments so that approximately .3 volt peak-to-peak is present at the third sound i-f grid return.

The band width at 70% response from the first sound i-f grid to the third i-f grid should be approximately 200 kc.

R-F AND CONVERTER LINE ADJUSTMENT—

Connect the r-f sweep oscillator to the receiver antenna terminals, J103. If the sweep oscillator has a 50 ohm single-ended output, it will be necessary to obtain balanced output by properly terminating the sweep output cable and connecting a 120 ohm non-inductive resistor in series between the sweep output cable and each receiver antenna terminal as shown in Figure 12.

Connect the oscilloscope to the junction of L80 and R6 (in the r-f tuning unit) through a 10,000 ohm resistor. This connection is available on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit. This hole is normally down when the chassis is in the recommended position. Connection can be easily made, however, by allowing the receiver to hang over the edge of the test bench by a few inches.

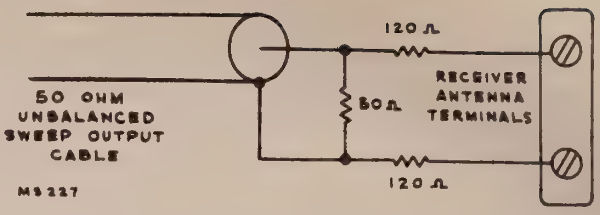

120 Ω
50 OHM UNBALANCED SWEEP OUTPUT CABLE
50 Ω
RECEIVER ANTENNA TERMINALS
120 Ω
MS227

Figure 12—Unbalanced Sweep Cable Termination

By-pass the first picture i-f grid to ground through a 1000 mmfd. capacitor. Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall in the r-f range and cause an incorrect picture of the r-f response.

Set the picture control for approximately −1.5 volts bias on the r-f stage. (For convenience check this voltage at the diodes of V108, pins 5 and 6.)

Connect the signal generator loosely to the receiver antenna terminals.

Set the C14 adjustment screw to its approximate normal operating position, 1½ turns out from maximum capacity. If the C14 capacity is less than this it may produce a resonance in channel 1, 2 or 3. During r-f alignment, such a resonance may show up as a "suck out" in the response curve of one of these channels. Under such conditions it will be impossible to obtain the proper response. With C14 set as specified or in later production receivers in which C14 is fixed, no such difficulty should be experienced.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7 (see Figure 17 for switch shaft flat location verses channel).

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust L25, L26, L51 and L52, (see Figure 19), for an approximately flat topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak to valley excursion and the markers occur at approximately 90% response. See Figure 19, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the response of channels 8 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 19 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 70% response. If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L25, L26, L51 and L52, and possibly compromise some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L11, L12, L37 and L38, for an approximately flat-topped response curve located symmetrically between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37 and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with approximately a 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion which should not be greater than 30% on any channel.

R-F OSCILLATOR LINE ADJUSTMENT –

The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

The heterodyne frequency meter is the more universal method since it is applicable to all types of receivers. However, it requires a great many calibration points since receivers with different i-f frequencies employ different oscillator frequencies and hence different calibration points on the frequency meter. This may result in confusion and errors in adjustment.

Since all sets must receive the same stations, the r-f sound carrier frequencies remain the same, regardless of i-f frequency. By use of this method, only one set of calibrating points is necessary. If these frequencies are crystal controlled, this method of alignment becomes very fast and with a minimum chance for error. However, this method is applicable only on receivers that use a sound discriminator, or other type of sound detector that has a definite and measurable characteristic at center frequency. This method cannot be easily employed on receivers that employ a slope type detector.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the following calibration points must be established for the 630TS.

Channel Number	Receiver R-F Osc. Freq. Mc.
1	71
2	81
3	87
4	93
5	103
6	109
7	201
8	207
9	213
10	219
11	225
12	231
13	237

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the following signals must be available.

Channel Number	R-F Sound Carrier Freq. Mc.
1	49.75
2	59.75
3	65.75
4	71.75
5	81.75
6	87.75
7	179.75
8	185.75
9	191.75
10	197.75
11	203.75
12	209.75
13	215.75

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the VoltOhmyst to the sound discriminator output (junction of R236 and C205).

Connect the signal generator to the receiver antenna terminals.

The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to channel 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. The core stud extensions should be maintained equal by visual inspection except as discussed in the following paragraph entitled Oscillator Pulling.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L76 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

Oscillator Pulling—If in setting the low frequency channels, the high frequency channels are pulled noticeably off frequency, or if it is impossible to set channels 10, 11 or 12 within the range of their respective trimmers, it may be due to interaction between sections of the line. A quick check can be made to determine if this is the case.

The shorting section of the r-f oscillator channel switch, (rotor), should be at ground r-f potential. If this is not the case due to dissymmetry in the circuit, the shorting section may be somewhat above ground. Since at these high frequencies, even the length of the shorting bar represents an appreciable portion of a wave length, the lower frequency section is effectively tapped up on the high frequency section and reflects reactance into it. This reactance varies with low frequency channel oscillator adjustments thus causing a shift in oscillator frequency on the upper channels. One way to cure this difficulty is to adjust the shorting switch to ground potential. This can be accomplished by staggering L77 and L78 until this condition is achieved.

To find if dissymmetry exists, remove the bottom cover from the r-f unit.

Set the channel switch to channel 10.

Disconnect any input from the receiver.

Connect the "VoltOhmyst" to R6 through the hole in the side of chassis, and measure the oscillator injection into the converter grid.

Take an insulated metal prod and touch the center of the oscillator rotor shorting bar. If the meter reading changes, it indicates that the bar is not at r-f ground.

To balance the line, switch to channel 13 and stagger the cores for one or more turns (usually L78 out and L77 in). The final adjustment must leave the oscillator on correct channel 13 frequency.

Switch back to channel 10 and touch the switch rotor as before. As before, meter movement indicates unbalance.

For fine balancing touch the switch contacts for channel 10. When balanced, the meter will show equal reduction for both contacts. Continue staggering the cores until balance is obtained.

Repeat the oscillator adjustments for all channels.

In later production receivers, several r-f oscillator coil changes were made and a capacitor C19 was added to minimize the oscillator pulling effect. In receivers in which C19 is present the staggering of cores should not be necessary.

CONVERTER GRID TRAP ADJUSTMENT—

Connect the sweep generator to the receiver antenna terminals. Observe the precaution for single-ended output generators mentioned in the r-f alignment section.

Connect the oscilloscope to R6 through 10,000 ohms.

Shunt the first picture i-f grid to ground with a 1,000 mmf. capacitor, keeping the leads as short as possible.

Couple the signal generator loosely to the receiver antenna terminals.

Switch the channel switch and signal generator through the low frequency channels and observe the response on each range.

Select a channel which is essentially flat over the operating range with the sound and picture carrier markers at 90% or higher on the response curve.

Remove the capacitor from the first picture i-f grid and shunt it from the second picture i-f grid to ground.

Adjust C14 for an r-f response curve similar to the one obtained with the first picture i-f grid shunted. See Figure 20.

In later production receivers, C14 is fixed and obviously this adjustment cannot be made on those sets. In such receivers, this step should be followed as a check to assure that proper converter operation is obtained.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—

The picture i-f response curve varies somewhat with change of bias and for this reason it should be aligned with approximately the same signal input as it will receive in operation.

If the receiver is located at the edge of the service area, it should be aligned with the picture control at the maximum gain position. However, for normal conditions, (signals of 800 microvolts or greater), it is recommended that the picture i-f be aligned with a grid bias of –3 volts.

Connect the sweep generator to the receiver antenna terminals.

Connect the signal generator to the antenna terminals and feed in the 25.75 mc i-f picture carrier marker and a 22.3 mc. marker.

Connect the oscilloscope across the picture detector load resistor.

Remove the shunting capacitor from the second picture i-f grid.

Set the i-f grid bias to –3 volts.

Set the sweep output to produce approximately .3 volt peak-to-peak across the picture detector load resistor.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 21.

If for example as in Figure 21A the response is peaked in the middle, and the picture carrier is low on the response curve slope, then the high Q transformer T103, (which is peaked at 25.3 mc.—near the picture carrier 25.75 mc.), should be retouched to bring the picture carrier response up to approximately 40%.

It will then probably be found that the response is generally high on the low frequency end of the curve as in Figure 21B. If this is the case, adjust L183, (25.2 mc. and fairly broad), to bring the high frequency end response up. The picture carrier is thus brought still further up the slope and an approximately flat topped response curve is obtained as in Figure 21C.

If T104 (bottom) required any adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

On final adjustment the picture carrier marker must be at approximately 60% response. The curve must be approximately flat topped and with the 22.3 mc. marker at approximately 100% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 60% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high frequency video response.

The above example is used to show the line of reasoning involved in making the retouching adjustments. Since there are five transformers each aligned to a different frequency, it is obvious that many different conditions can exist, however, similar reasoning will apply to each case. With some experience in making these adjustments, it will be found that the desired response can be readily obtained. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

SENSITIVITY CHECK—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through an attenuator pad of the type shown in Figure 13. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position.

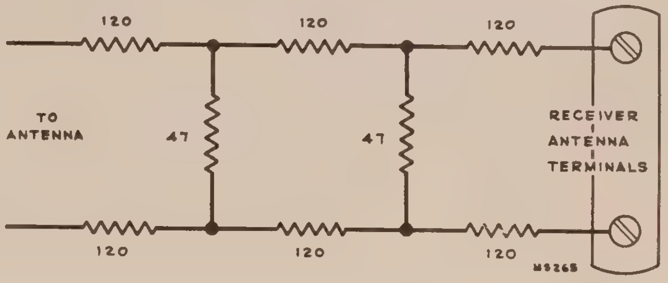


Figure 13—Attenuator Pad

Only carbon type resistors should be used to construct the attenuator pad. Since many of the low value moulded resistors generally available are of wire wound construction, it is advisable to break and examine one of each type of resistor used in order to determine its construction.

RESPONSE CURVES—The response curves shown on page 22 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected. On early production, channel 4, r-f response is somewhat more narrow than that shown which is from later production. Channel 2 response (not shown) is similar to that of channel 3.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment. If it is found that the dual listing is confusing, the unwanted listing can be easily erased.

ALIGNMENT TABLE

The detailed alignment procedure beginning on page 14 should be read before alignment by use of the table is attempted.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	PICTURE I-F AND TRAP ADJUSTMENT								
1	Not used		Not used		Not used	Junction of R189 & R190		Picture control for −3 volts on meter	Fig. 16
2	Antenna terminal	19.75	"		"	Junction of L188 & R137	Meter on 3 volt scale	T104 (top) for min. on meter	Fig. 16 Fig. 14
3	"	21.25	"		"	"	"	T2 (top) for min.	Fig. 14
4	"	21.25	"		"	"	"	T105 (top) for min.	"
5	"	27.25	"		"	"	"	T103 (top) for min.	"
6	"	21.8	"		"	"	"	T2 (bottom) for max.	Fig. 15
7	"	25.3	"		"	"	"	T103 (bottom) for max.	"
8	"	22.3	"		"	"	"	T104 (bottom) for max.	"
9	"	25.2	"		"	"	"	L183 (top chassis) for max.	Fig. 14
10	"	23.4	"		"	"	"	L185 (top chassis) for max.	"
11	If T104 (bottom) required adjustment in step 8, repeat step 2.								
	DISCRIMINATOR AND SOUND I-F ALIGNMENT								
12	3rd sound i-f grid (pin 1, V106)	21.25 1 volt output	Not used		Not used	In series with 1 meg. to junction of R219 & R220		Detune T113 (bottom). Adjust T113 (top) for max. on meter	Fig. 16 Fig. 15 Fig. 14
13	"	"	"		"	Junction of R236 & C205	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 16 Fig. 15
14	"	"	3rd sound i-f grid (pin 1, V106)	21.25 center 1 mc. wide 1 v. out	Junction of R236 & C205	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 16 Fig. 18 A
15	2nd sound i-f grid (pin 1, V105)	21.25 reduced output	2nd sound i-f grid	21.25 reduced output	Terminal A, T112 in series with 33,000 ohms	"	Sweep output reduced to provide .3 volt p-to-p on scope	T112 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 16 Fig. 14 Fig. 15 Fig. 18 B
16	Trap winding on T2 (top of chassis)	21.25 reduced output	Trap winding on T2	21.25 reduced output	"	"	"	T111 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 14 Fig. 15 Fig. 16 Fig. 18 B
	R-F AND CONVERTER LINE ALIGNMENT								
17	Not used		Not used		Not used	Pin 5 or 6, V108	Set C14 1½ turns out from max. cap.	Picture control for −1.5 volts on meter	Fig. 16 Fig. 15
18	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweeping channel 7	Junction L80 and R6 through 10,000 ohm series resistor	Not used	1st i-f grid bypass to gnd. with 1000 mmf. Receiver on channel 7	L25, L26, L51 & L52 for approx. flat top response between markers. Markers above 70%	Fig. 16 Fig. 15 Fig. 19 (7)
19	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 19 (8)
20	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 19 (9)
21	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 19 (10)
22	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 19 (11)
23	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 19 (12)
24	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 19 (13)
25	If the response on any channel (steps 19 through 24) is below 70% at either marker, switch to that channel and adjust L25, L26, L51 & L52 to pull response up on that channel. Then recheck steps 18 through 24.								

ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				R-F AND CONVERTER LINE ALIGNMENT (Cont'd)					
26	Antenna terminal (loosely)	83.25 87.75	Antenna terminals (see text for precaution)	Sweeping channel 6	Junction L80 and R6 through 10,000 ohm series resistor	Not used	Receiver on channel 6	L11, L12, L37 & L38 for response as above	Fig. 19 (6)
27	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 19 (5)
28	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 19 (4)
29	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 19 (3)
30	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	
31	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 19 (1)
32	If the response on any channel (steps 27 through 31) is below 70% at either marker, switch to that channel and adjust L11, L12, L37 & L38 to pull response up on that channel. Then recheck steps 26 through 31.								

R-F OSCILLATOR ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
33	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of R236 & C205 for sig. gen. method only	Fine tuning centered for all adjustments Receiver on channel 13	L77 & L78 for zero on meter or beat on het. freq. meter	Fig. 16 Fig. 15
34	"	209.75	"	231	"	"	Receiver on channel 12	L76 as above	Fig. 17
35	"	203.75	"	225	"	"	Receiver on channel 11	L74 as above	"
36	"	197.75	"	219	"	"	Receiver on channel 10	L72 as above	"
37	"	191.75	"	213	"	"	Receiver on channel 9	L70 as above	"
38	"	185.75	"	207	"	"	Receiver on channel 8	L68 as above	"
39	"	179.75	"	201	"	"	Receiver on channel 7	L66 as above	"
40	"	87.75	"	109	"	"	Receiver on channel 6	L63 & L64 as above	Fig. 15
41	"	81.75	"	103	"	"	Receiver on channel 5	L62 as above	Fig. 17
42	"	71.75	"	93	"	"	Receiver on channel 4	L60 as above	"
43	"	65.75	"	87	"	"	Receiver on channel 3	L58 as above	"
44	"	59.75	"	81	"	"	Receiver on channel 2	L56 as above	"
45	"	49.75	"	71	"	"	Receiver on channel 1	L54 as above	"
46	Repeat steps 33 through 45 as a check.								

CONVERTER GRID TRAP ADJUSTMENT

47	Antenna terminal (loosely)	Sound and Pix Carrier of Selected Channel	Not used		Junction L80 and R6 (in r-f unit)	Not used	Connect sweep to ant. terms. 1st pix i-f grid bypassed to gnd. with 1000 mmf.	Switch through channels 1 through 6. Select channel with flat response and markers above 80%	Fig. 16 Fig. 20 (A)
48	"	"	"		"	"	Move 1000 mmf bypass from 1st pix i-f grid to 2 i-f grid	Adjust C14 for response curve similar to that obtained above	Fig. 16 Fig. 20 (B)

RETOUCHING PICTURE I-F TRANSFORMERS

49			Not used		Not used	Junction of R189 & R190	Receiver & sweep on same channel as above. Remove i-f grid bypass	Adjust picture control for −3 volts on meter	Fig. 16
50	Antenna terminals (loosely)	22.3 25.75	"		Junction L188 and R137	Not used	Retouch pix i-f adjustments (T2, T103, T104 bottoms L183 & L185) as necessary to provide proper response		Fig. 16 Fig. 15 Fig. 21
51	If T104 (bottom) was adjusted in step 50, repeat step 2 and step 50.								

SENSITIVITY CHECK

52	Connect antenna to receiver through attenuator pad to provide weak signal. Compare picture and sound obtained to that obtained on other receivers under the same conditions.

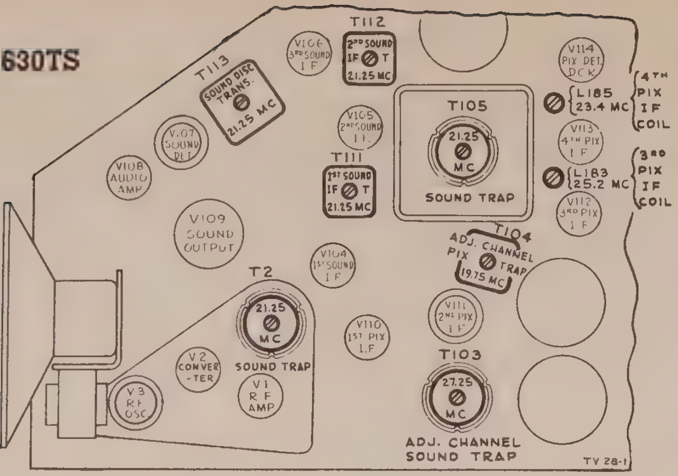
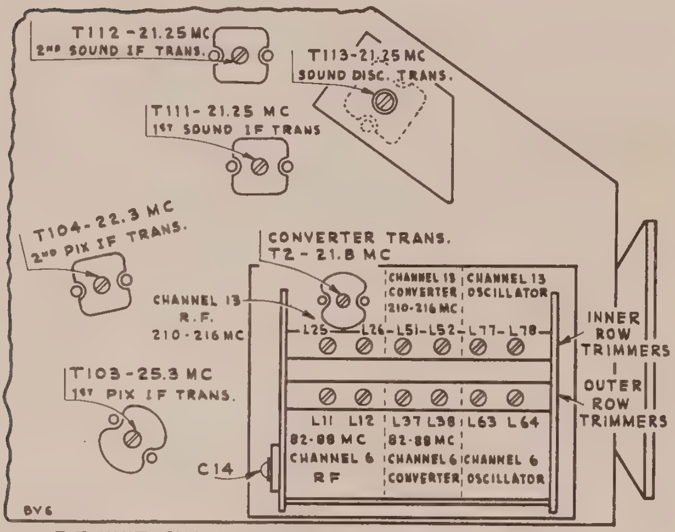

T112
2ND SOUND IF T 21.25 MC
T113 SOUND DISC TRANS. 21.25 MC
V106 3RD SOUND I F
V107 SOUND DET
V108 AUDIO AMP
V105 2ND SOUND I F
T111
1ST SOUND IF T 21.25 MC
T105
21.25 MC
SOUND TRAP
V114 PIX DET DCK
L185 23.4 MC
4TH PIX IF COIL
V113 4TH PIX I F
L183 25.2 MC
3RD PIX IF COIL
V112 3RD PIX I F
V109 SOUND OUTPUT
V104 1ST SOUND I F
T104
ADJ. CHANNEL PIX TRAP 19.75 MC
T2
21.25 MC
SOUND TRAP
V111 2ND PIX I F
V110 1ST PIX I.F
V2 CONVER-TER
V1 R F AMP
V3 RF OSC
T103
27.25 MC
ADJ. CHANNEL SOUND TRAP
TV 28-1

Figure 14—Top Chassis Adjustments


T112 - 21.25 MC
2ND SOUND IF TRANS.
T113-21.25 MC
SOUND DISC. TRANS.
T111- 21.25 MC
1ST SOUND IF TRANS
T104- 22.3 MC
2ND PIX IF TRANS.
CONVERTER TRANS.
T2 - 21.8 MC
CHANNEL 13 CONVERTER 210-216 MC
CHANNEL 13 OSCILLATOR
CHANNEL 13 R.F. 210-216 MC
L25 L26 L51 L52 L77 L78
INNER ROW TRIMMERS
OUTER ROW TRIMMERS
T103 - 25.3 MC
1ST PIX IF TRANS.
L11 L12 82-88 MC CHANNEL 6 RF
L37 L38 82-88 MC CHANNEL 6 CONVERTER
L63 L64 CHANNEL 6 OSCILLATOR
C14
BV6

RF UNIT SHOWN WITH SHIELD REMOVED

Figure 15—Bottom Chassis Adjustments

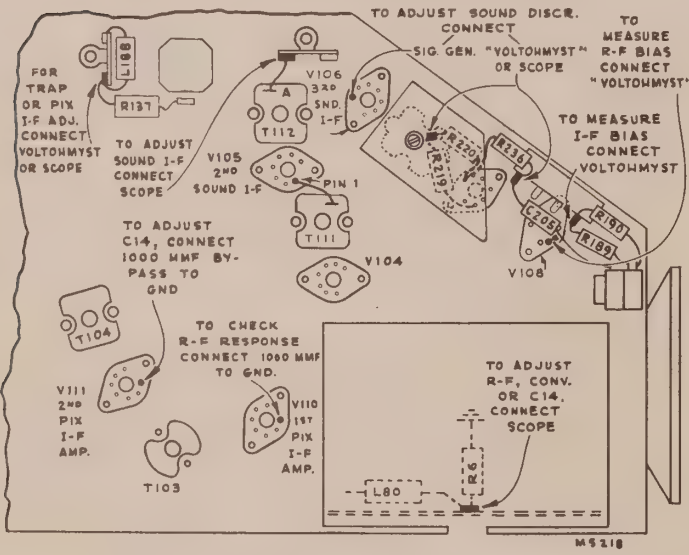
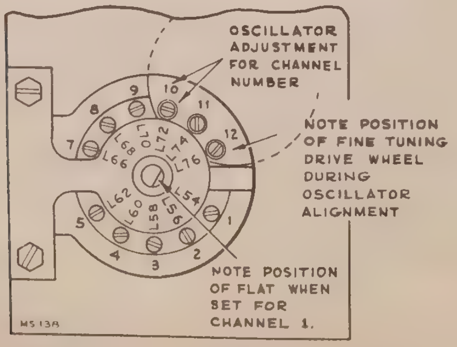

TO ADJUST SOUND DISCR. CONNECT
SIG. GEN. "VOLTOHMYST" OR SCOPE
TO MEASURE R-F BIAS CONNECT "VOLTOHMYST"
L188
R137
FOR TRAP OR PIX I-F ADJ. CONNECT VOLTOHMYST OR SCOPE
A
V106 3RD SND. I-F
T112
TO ADJUST SOUND I-F CONNECT SCOPE
V105 2ND SOUND I-F
PIN 1
T111
R220
R219
R236
TO MEASURE I-F BIAS CONNECT VOLTOHMYST
C205
R190
R189
V108
V104
TO ADJUST C14, CONNECT 1000 MMF BY-PASS TO GND
T104
TO CHECK R-F RESPONSE CONNECT 1000 MMF TO GND.
V111 2ND PIX I-F AMP.
V110 1ST PIX I-F AMP.
T103
TO ADJUST R-F, CONV. OR C14, CONNECT SCOPE
L80
R6
MS218

Figure 16—Test Connection Points


OSCILLATOR ADJUSTMENT FOR CHANNEL NUMBER
NOTE POSITION OF FINE TUNING DRIVE WHEEL DURING OSCILLATOR ALIGNMENT
NOTE POSITION OF FLAT WHEN SET FOR CHANNEL 1.
1
2
3
4
5
7
8
9
10
11
12
L54
L56
L58
L60
L62
L66
L68
L70
L72
L74
L76
MS138

OSCILLATOR ADJUSTMENTS FOR CHANNELS 6 AND 13 ARE ON SIDE OF R.F. UNIT

Figure 17—R-F Oscillator Adjustments

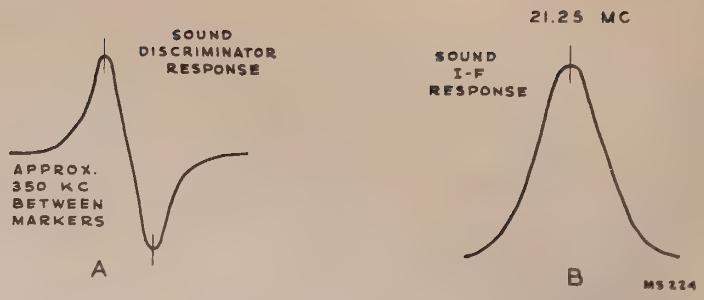


Figure 18—Sound Discriminator and I-F Response

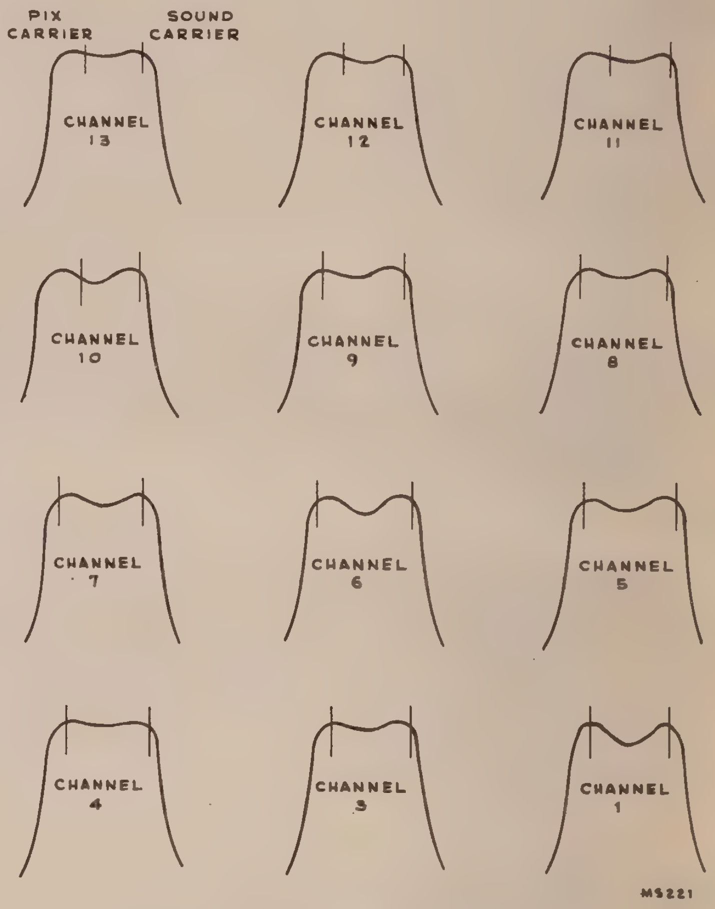


Figure 19—R-F Response

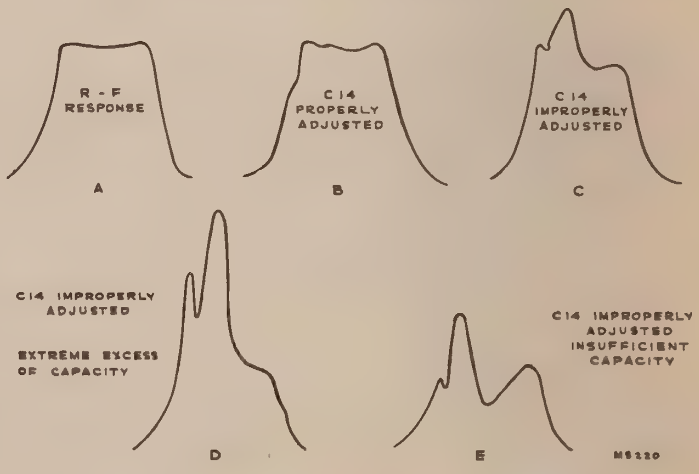


Figure 20—Effects of C14 Adjustments

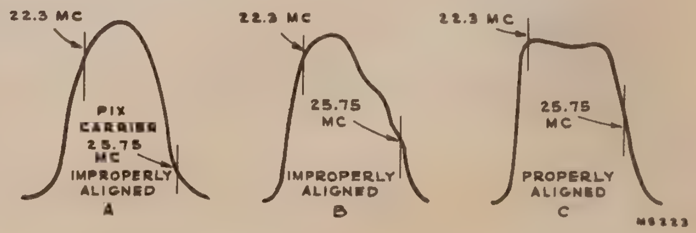


Figure 21—Overall Response

RECEIVER HANDLING PRECAUTION—**The 630TS Receiver weighs approximately 85 pounds and therefore should always be picked up from under the bottom of the cabinet since lifting by the top would tend to pull the cabinet apart.**

The receiver is shipped with all tubes in their sockets except the 10BP4 Kinescope. **The Kinescope is shipped in a special carton and should not be unpacked until ready for installation.**

SETTING UP THE RECEIVER—Remove the top of the receiver cabinet as indicated in Figure 22. Install the front panel control knobs. Make sure that all tubes are in place and firmly seated in their sockets. Remove the protective cardboard shield from the 5U4G rectifier tube.

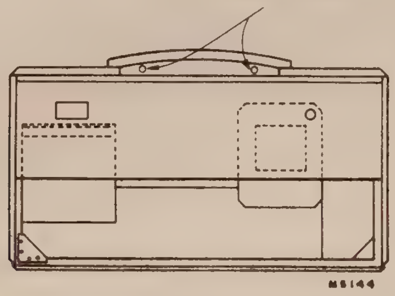

TO REMOVE CABINET TOP, TAKE OUT THESE SCREWS & SLIDE TOP BACK

Figure 22—Cabinet, Rear View

Loosen the two kinescope cushion adjustment wing screws and slide the cushion towards the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 23 for the location of the cushion and yoke adjustments.

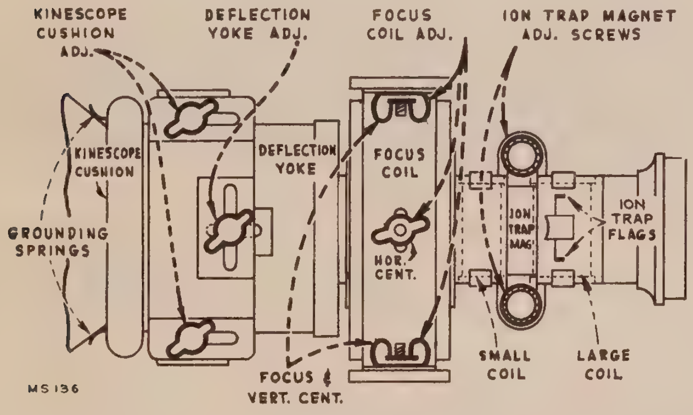


Figure 23—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check and alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise lower or rotate the coil until such an alignment is obtained. Tighten the wingnuts with the coil in this position.

Loosen the two lower Kinescope face centering slides, and set them at approximately mid position. See Figure 24 for location of the slides and their adjustment screws. Loosen the ion trap magnet adjustment thumb screws.

KINESCOPE HANDLING PRECAUTION—**Do not open the Kinescope shipping carton, install, remove, or handle the Kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the Kinescope. Keep the Kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.**

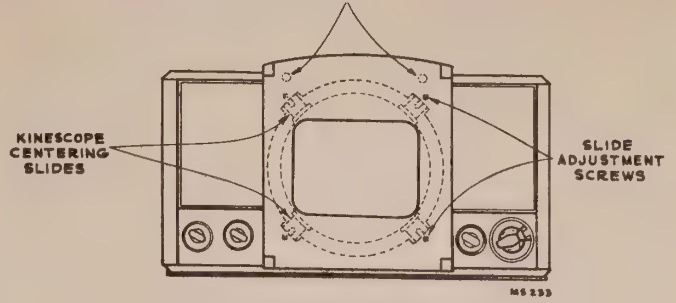

TO INSTALL CABINET FRONT PANEL INSERT THESE SCREWS INSIDE CABINET.

Figure 24—Cabinet, Front View

INSTALLATION OF KINESCOPE—The Kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the Kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck, is provided with two small metal flags, as shown in Figure 25. The Kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Fgure 23.

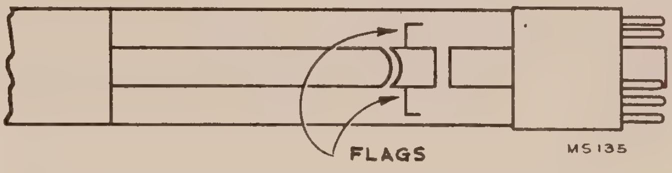


Figure 25—Ion Trap Flags

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 26 until the base of the tube protrudes approximately two inches beyond the focus coil. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the **tube.**

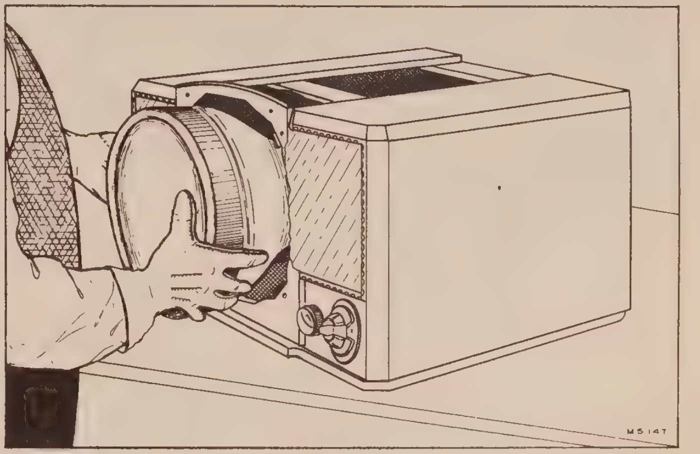


Figure 26—Kinescope Insertion

Slip the ion trap magnet on the neck of the Kinescope with the large coil toward the base of the tube as shown in Figure 23. Connect the Kinescope socket to the tube base. Insert the Kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet.

Adjust the four centering slides until the face of the Kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the Kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with "Windex" or similar cleaning agent.

Install the cabinet front as indicated in Figure 24.

Slip the Kinescope as far forward as possible. Slide the Kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the Kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The rear ion trap magnet poles should be approximately over the ion trap flags as shown in Figure 23. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the Kinescope for the brightest raster on the screen. Tighten the magnet adjustment thumbscrews sufficiently to hold it in this position but still free enough to permit further adjustment. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R184 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R181 and R211 to mid position. See Figure 27 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

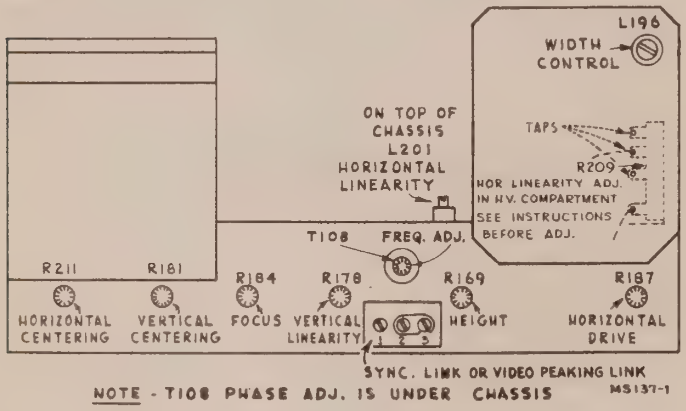


Figure 27—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See step 2 through 9 and the note of the receiver operating instructions on page 3.

CHECK OF LINK CONNECTION—In early receivers, the link board J102 was connected to the horizontal oscillator control tube. In late production, the link was employed to provide optional video peaking. See page 9 for a description of the functions of the link. In order to determine which type of connection is employed in a particular set, touch the finger to terminal #3. If the picture is displaced horizontally the board is connected to the oscillator. Little or no effect may be noticed if the board is connected to the video stage.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—If the board was found to be connected to the control tube in the above test, set the link in the normal position (2 to 3). Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by turning the picture control fully counter-clockwise and then returning it to the operating position. Normally the picture will pull into sync.

Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator and proceed with 'FOCUS' adjustments."

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adjust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove the signal. Turn the T108 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

Turn the T108 frequency adjustment (on rear apron), until the picture is synchronized. (If the picture is not synchronized vertically, adjust the vertical hold.) Adjust the picture control so that the picture is somewhat below average contrast level. Turn the T108 phase adjustment screw (under chassis, see Figure 11) until the blanking bar, which may appear in the picture moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condition (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to extreme counter-clockwise position. Turn T108 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counter-clockwise to the point where the picture falls in sync again.

Readjust T108 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to extreme clockwise. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase. Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T108 frequency adjustment counter-clockwise until the picture falls in sync.

Turn horizontal hold to extreme counter-clockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory.

There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V124.

Excessive pull-in is objectionable because the higher sensitivity of the control circuits means also greater susceptibility to noise, and to the vertical sync and equalizing pulses which tend to cause a bend in the upper part of the raster. This effect is more noticeable when the sync link is in the 1-2 position.

FOCUS—A slightly better average focus may be obtained by sliding the focus coil back and forth along the Kinescope neck while adjusting the focus control and watching the test pattern. The final adjustment of the focus coil should leave the raster approximately centered.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R169 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R178 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive (R187 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage to the Kinescope second anode. Adjust the width control (L196 on rear chassis) until the picture just fills the mask horizontally (8½ inches). Adjust the horizontal linearity control L201 (see Figure 27) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust horizontal centering to align the picture with the mask.

If repeated adjustments of drive width and linearity fail to give proper linearity, it may be necessary to move the tap on R209, which is located in the high voltage compartment. Adjustments of drive, width and linearity must then be repeated.

Check to see that all cushion, yoke, focus coil and ion trap thumb screws are tight. Replace the cabinet top.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal calibrated test oscillator or heterodyne frequency meter, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 21. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 28. Adjustments for channels 6 and 13 are under the chassis. See Figure 15 for their location.

Tune in all available Television Stations. Observe the picture for detail, for proper interlacing and for the presence of interference or reflections. If these are encountered, see the section on antennas on page 26.

INSTALLATION INSTRUCTION TABLE

Step No.	Proceed as Indicated
1	Remove receiver cabinet top. Install knobs.
2	Make sure all tubes are firmly seated in their sockets.
3	Remove cardboard shield from rectifier tube.
4	Slide Kinescope cushion toward rear of chassis.
5	Slide deflection yoke toward rear of chassis—tighten.
6	Align focus coil with yoke—tighten.
7	Set lower Kinescope centering slides to mid-position.
8	Loosen ion trap adjustment thumbscrews.
9	Insert Kinescope until base protrudes two inches beyond focus coil.
10	Slip ion trap on Kinescope neck, large coil to rear. Install Kinescope socket.
11	Insert Kinescope until face protrudes one-quarter inch outside cabinet front.
12	Adjust all four Kinescope centering slides—tighten.
13	Wipe Kinescope face and front panel safety glass.
14	Install cabinet front panel.
15	Slip Kinescope forward, slip cushion forward—tighten.
16	Slip deflection yoke forward.
17	Connect Kinescope high voltage lead.
18	Connect receiver to a-c line and antenna.
19	Turn receiver on, brightness fully clockwise, picture counterclockwise.
20	Adjust ion trap for bright raster.
21	Reduce brightness, adjust focus control R184 for visible line structure.
22	Adjust ion trap and brightness control for brightest raster with which line focus can be maintained.
23	Set centering controls R181 and R211 to mid-position.
24	Adjust focus coil for non-shadowed raster approx. centered.
25	Adjust yoke to orient raster with picture mask—tighten.
26	Tune in station per operating instructions—steps 2 through 9.
27	Check horizontal oscillator for hold and pull-in with horizontal hold control at each extreme.
28	Align horizontal oscillator (T108) if necessary.
29	Adjust focus coil and focus control.
30	Adjust height and vertical linearity and vertical centering controls.
31	Adjust width, horizontal drive, linearity and horizontal centering controls.
32	MAKE SURE ALL ADJUSTMENTS ARE TIGHT.
33	Replace cabinet top.
34	Check r-f oscillator frequency on all channels.
35	Observe picture from all available stations.

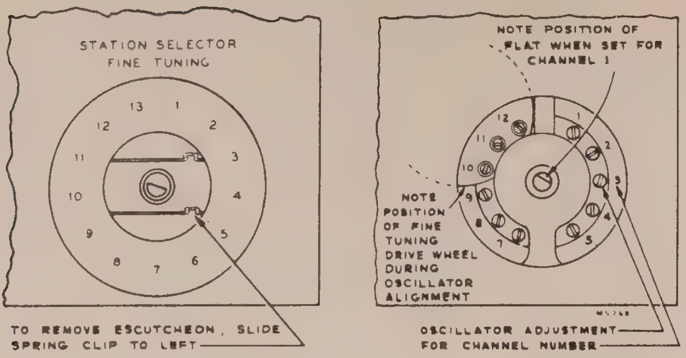

STATION SELECTOR FINE TUNING
13
1
2
3
4
5
6
7
8
9
10
11
12
TO REMOVE ESCUTCHEON, SLIDE SPRING CLIP TO LEFT
NOTE POSITION OF FLAT WHEN SET FOR CHANNEL 1
NOTE POSITION OF FINE TUNING DRIVE WHEEL DURING OSCILLATOR ALIGNMENT
OSCILLATOR ADJUSTMENT FOR CHANNEL NUMBER

Figure 28—R-F Oscillator Adjustments

VENTILATION CAUTION—The receiver is provided with adequate ventilation holes in the bottom, back and top of the cabinet. Care should be taken not to allow these holes to be covered or ventilation impeded in any way.

ANTENNAS—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

REFLECTIONS—If reflections are encountered, it may be possible to eliminate them by rotation of the antenna. A shift of direction or a few feet in antenna position may effect a tremendous difference in picture reception.

Occasionally reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

INTERFERENCE—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause noise interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

INFORMATION REFERENCES— For further information on antennas and antenna installation see RCA Booklet entitled "Practical Television by RCA," and also the specific instructions accompanying the RCA Television Antenna.

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults.

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet—Coils reversed either front to back or top to bottom, ion trap magnet coil open.

(2) V126 or V127 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T109 high voltage winding is open, (points 2 to 3), the 8016 tube is defective, its filament circuit is open, C187 is shorted, R233 or R235 open.

(4) V125 and V120-B circuits inoperative—check for sine wave on V125 grid, pulse on V120-B grid, and sawtooth on V126 grid. Refer to schematic and wave form chart.

(5) Reaction scanning tube (V128) inoperative.

(6) Defective Kinescope.

(7) R152 open, (terminal 3 to ground).

(8) No receiver plate voltage—filter capacitor or speaker field shorted—negative bleeder or speaker field open.

NO VERTICAL DEFLECTION:

(1) V121 or V122 inoperative. Check voltage and wave forms on grids and plates.

(2) T107 open.

(3) Vertical deflection coils open.

NO HORIZONTAL DEFLECTION:

(1) V125, V120B, V126 or V128 inoperative—check voltage and wave forms on grids and plate.

(2) T109 open.

(3) Horizontal deflection coil open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V122.

(2) Vertical output transformer defective.

(3) V121 inoperative—check voltage and wave forms on grid and plate.

(4) R174, C158, C221-C or C222-B defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V128 or V126.

(2) T109 or L201 defective.

(3) C186 or C188 or R209 defective.

(4) C179, R187 or R210 defective.

PICTURE OUT OF PHASE HORIZONTALLY:

(1) T108 winding D to F incorrectly tuned or connected in reverse.

(2) R200 or R202 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) Improper adjustment of focus coil or ion trap magnet.

(2) Defective yoke.

RASTER & SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V104, V105, V106, V107, V108, V109 and their socket voltages.

(3) T114 or C209 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) Picture control advanced too far.

(2) V114-B, V118, V119, or V120-A inoperative. Check voltage and waveforms at their grids and plates.

(3) C142 defective.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V121 and associated circuit—C154, T106, etc.

(2) Integrating network inoperative—Check C149, C151, C152, C153, R162, R163, R164 and R165.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T108 misadjusted—readjust as instructed on page 24.

(2) V123 or V124 inoperative—check socket voltages and waveforms.

(3) T108 defective.

(4) C166, C167, C170 or C171 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C168, C169, R168 and R196.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V114, V115 or V116 defective.

(2) Peaking coils defective—check for specified resistance.

(3) C138, C140, C141 or C142 defective.

(4) Make sure that the focus control operates on both sides of proper focus.

(5) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) Video amplifier overloaded by excessive input—reduce picture control setting.

(2) Insufficient bias on V115 and V116 resulting in grid current on video signal. Check bias and possible grid current.

(3) Defective coupling condenser or grid load resistor—check C138, C140, C141, C223B, R138, R142, R143, R148, etc.

(4) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) Picture control operated at excessive level.

(2) If regular sections at the left picture are displaced change V126.

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync. Connect sync link to terminal 1 and 2.

SOUND & RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V110, V111, V112, V113, V114, V115 and V116—check socket voltages.

(2) Bad contact to Kinescope grid.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—Check V1, V2, V3 and their socket voltages.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V126.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C181 defective.

(2) V128 defective.

(3) Change tap on R209.

CRITICAL LEAD DRESS:

1. Dress spaghetti-covered leads from A and B on discriminator transformer T113 to pin 7 and 2 on V107 tube socket approximately 3/16" above chassis.
2. Dress video capacitors C-138, C-140 and C-141 up and away from chassis.
3. Dress video peaking coils L-187, L-188, L-189, L-190, L-191 and L-192 up and away from chassis.
4. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.
5. Dress leads from L196 (width control coil) away from the lead to the cap of V127 (h-v rectifier). Contact between these leads will cause arcing and fire.
6. Dress T109 winding leads as shown in Figure 29.

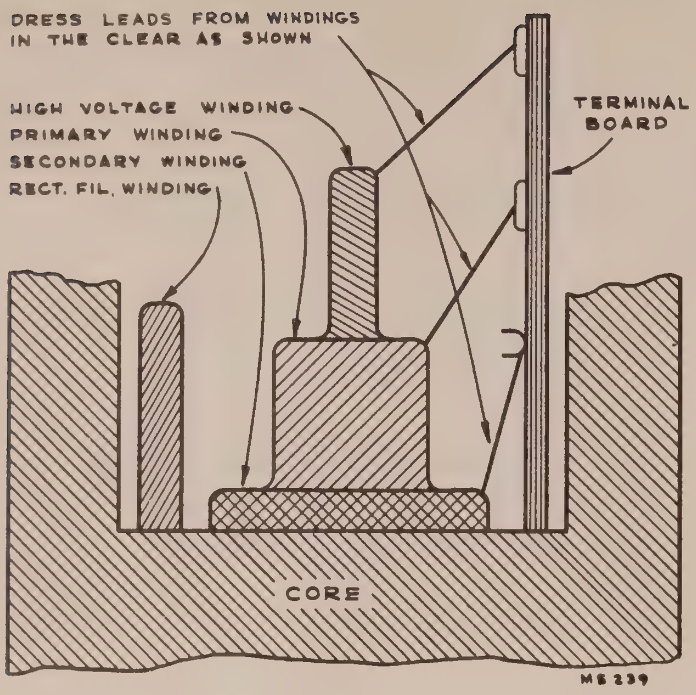

DRESS LEADS FROM WINDINGS IN THE CLEAR AS SHOWN
HIGH VOLTAGE WINDING
PRIMARY WINDING
SECONDARY WINDING
RECT. FIL. WINDING
TERMINAL BOARD
CORE
MS 239

Figure 29—T109 Lead Dress

PICTURE I-F RESPONSE—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method.

Select a channel with a flat r-f response as outlined in the converter grid trap adjustment section of the alignment procedure.

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 54 through 58 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

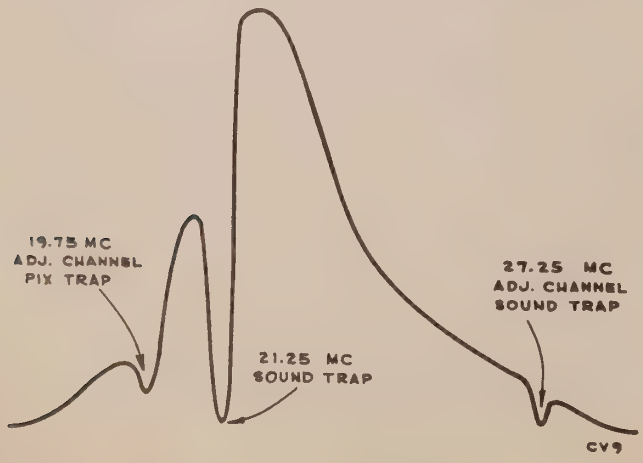


Figure 30—T2 Response

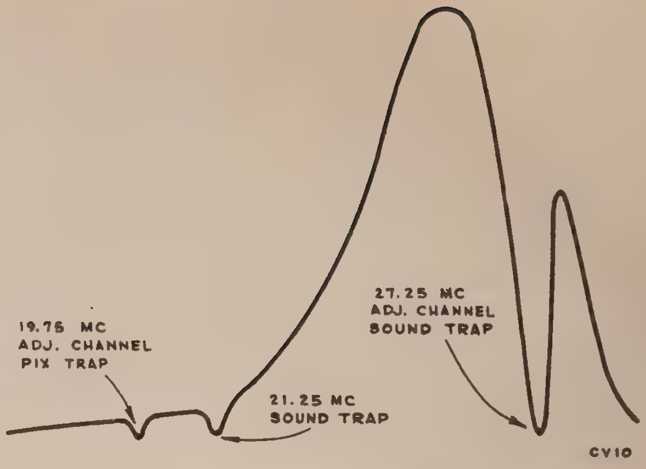


Figure 31—T103 Response

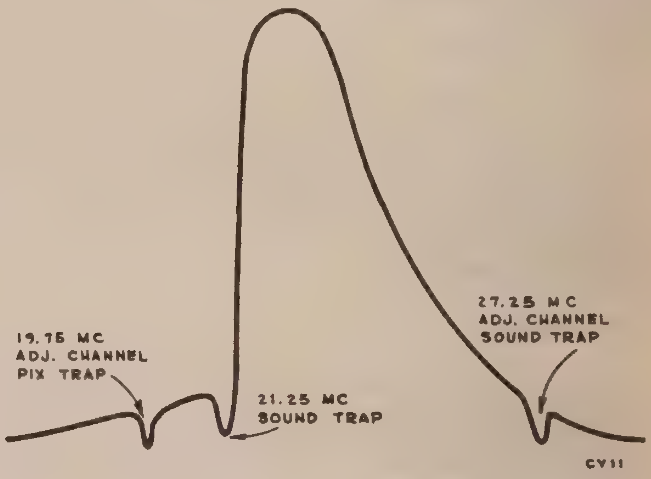


Figure 32—T104 Response

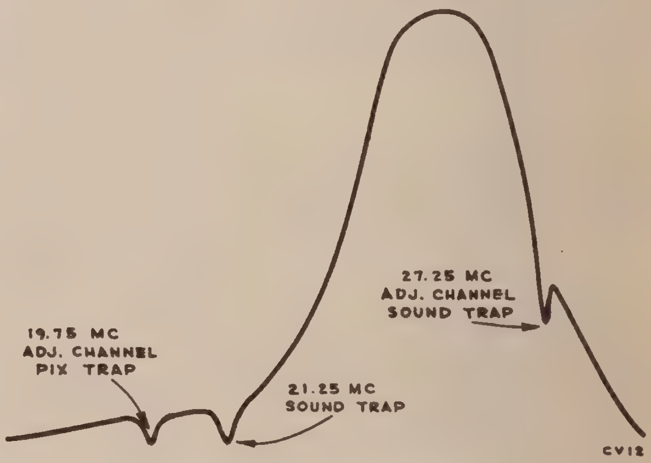


Figure 33—L183 Response

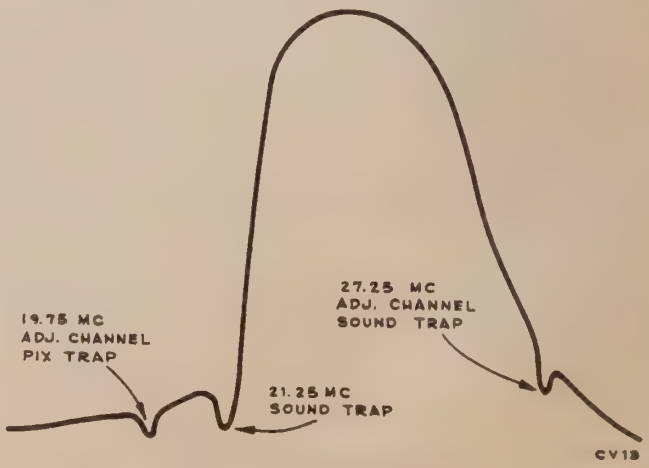
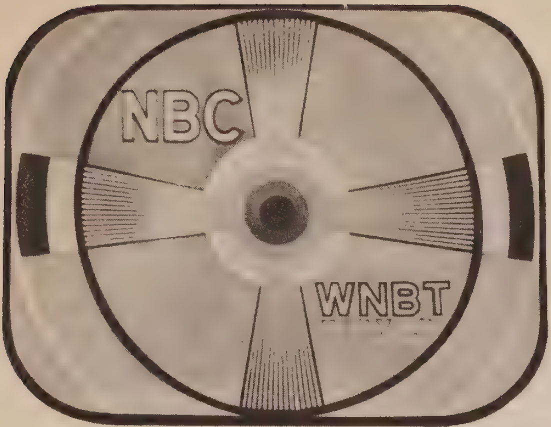


Figure 34—L185 Response



PH216

Figure 35—Normal Picture

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Figure 36—Vertical Hold Control Misadjusted

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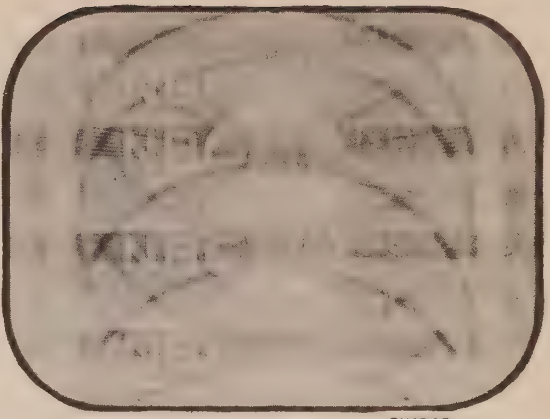
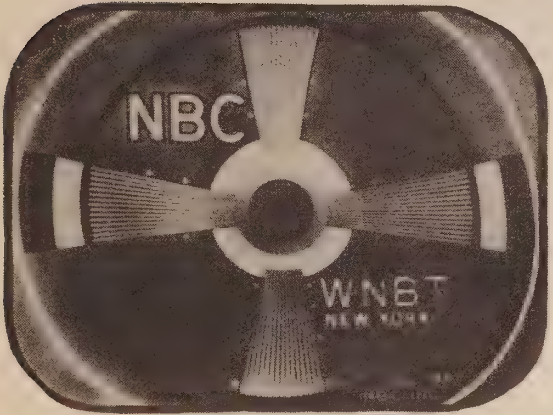


PH104B


NBC
WNBT
NEW YORK

PH104C

Figure 37—Picture Control Misadjusted

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Figure 38—Brightness Control Misadjusted

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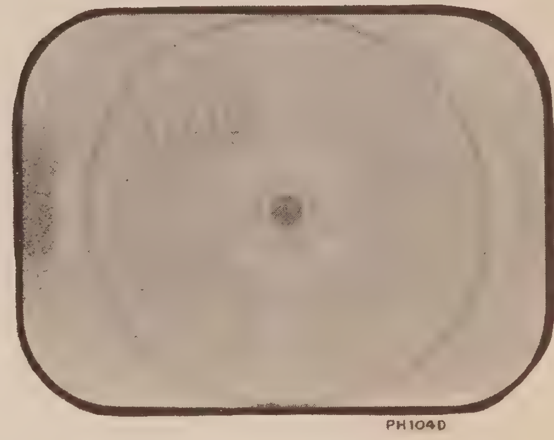
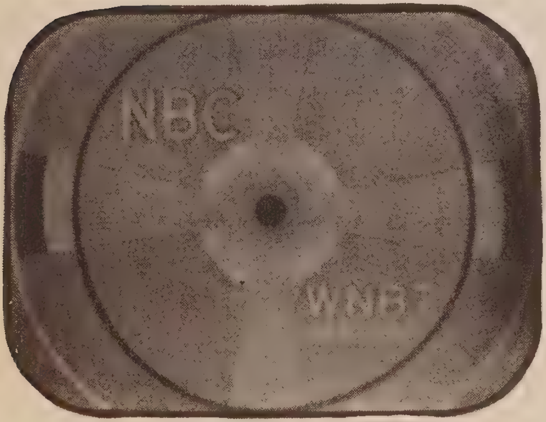


PH104D



PH105A

Figure 39—Weak Signal

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Figure 40—Interference from Another Signal

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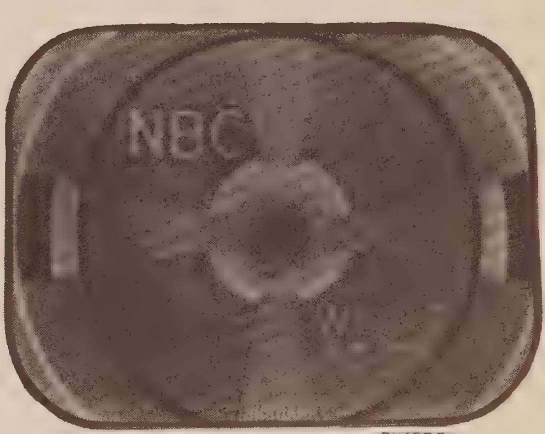
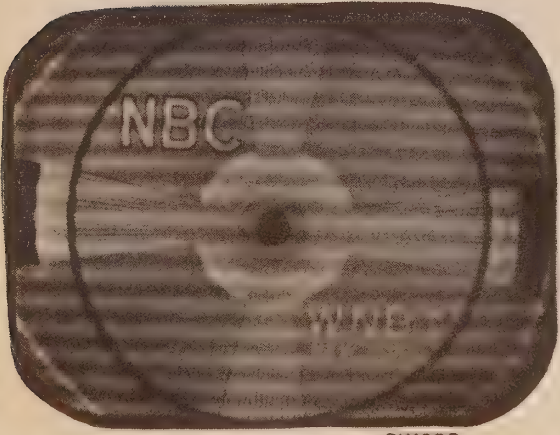


PH105B



PH105C

Figure 41—Sound in the Picture

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Figure 42—Interference, Diathermy, etc.

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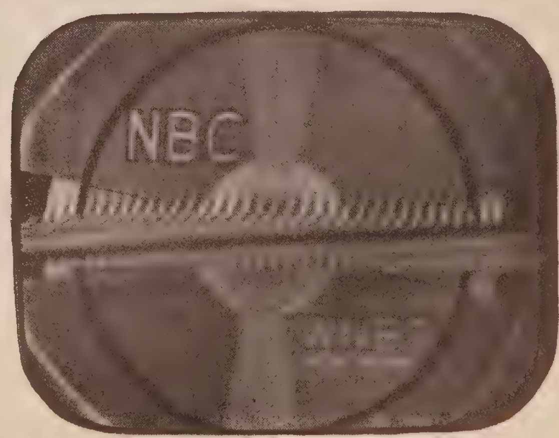
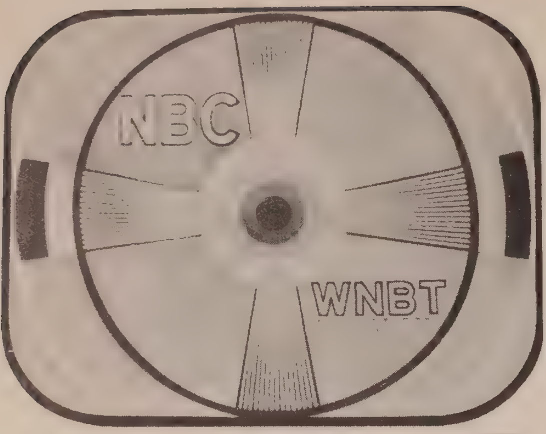


PH105D

TEST PATTERN PHOTOGRAPHS



PH216

Figure 43—Normal Picture

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Figure 44—Focus Coil and Ion Trap Magnet Misadjusted

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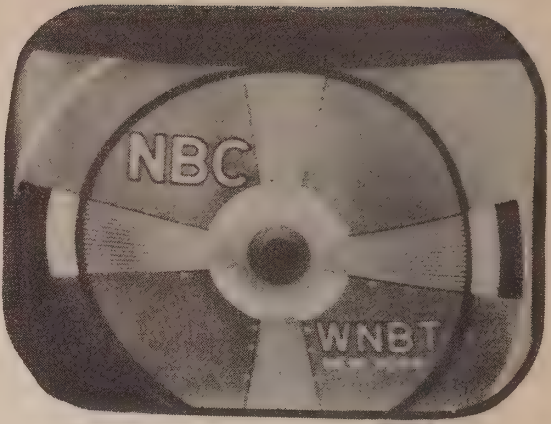
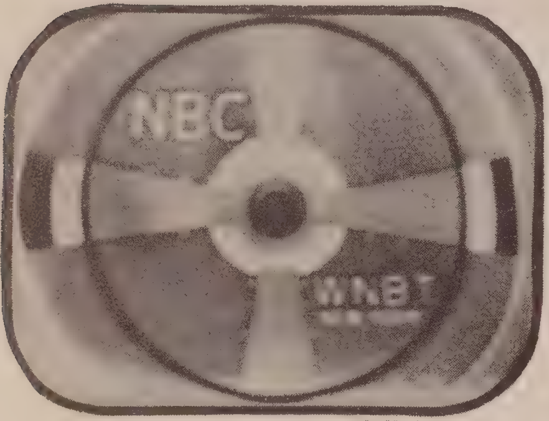


PH106B



PH106C

Figure 45—Focus Control Misadjusted

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Figure 46—Deflection Yoke Misadjusted (Rotated)

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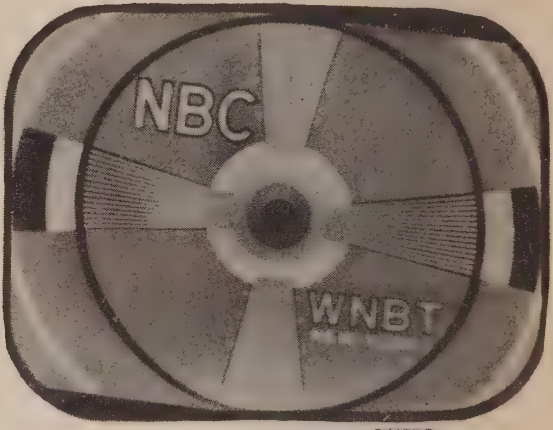

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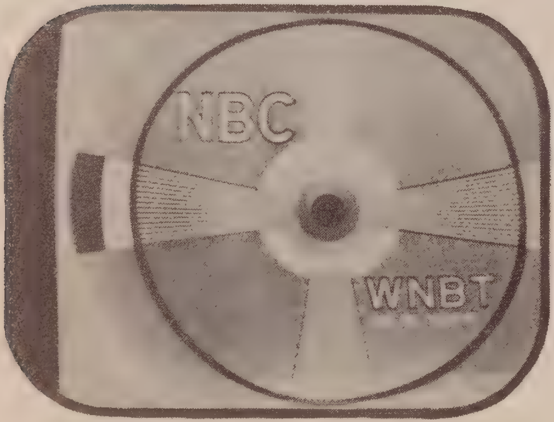

PH106D

Figure 47—Horizontal Centering Control Misadjusted

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Figure 48—Vertical Centering Control Misadjusted

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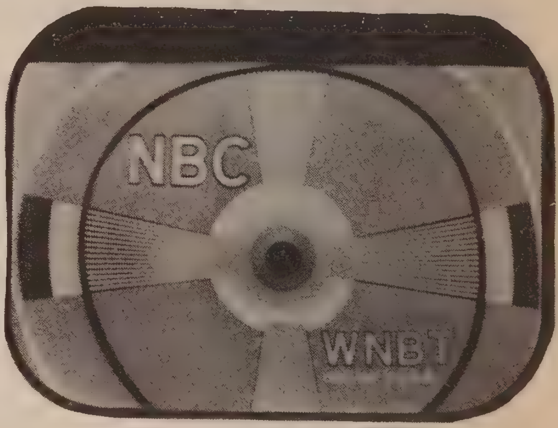
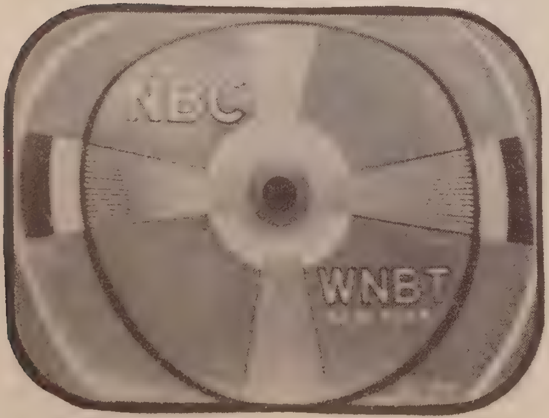


PH107A



PH107C

Figure 49—Vertical Linearity Control Misadjusted

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Figure 50—Height Control Misadjusted

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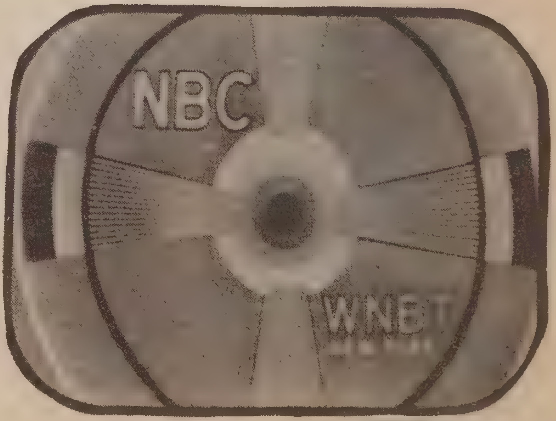
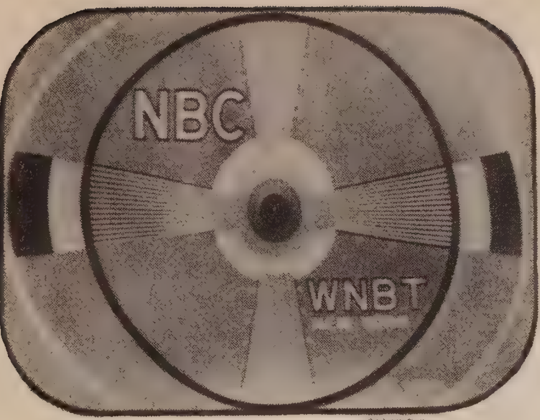


PH107D

TEST PATTERN PHOTOGRAPHS



PH108 A

Figure 51—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

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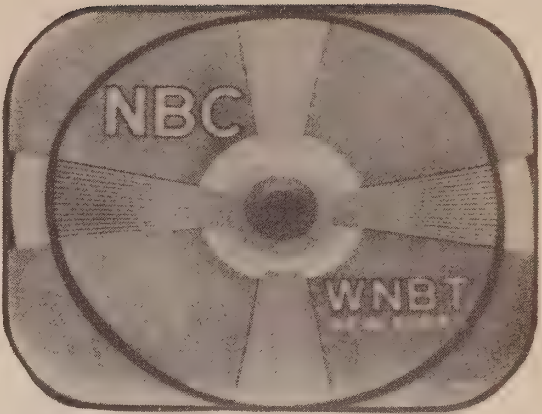
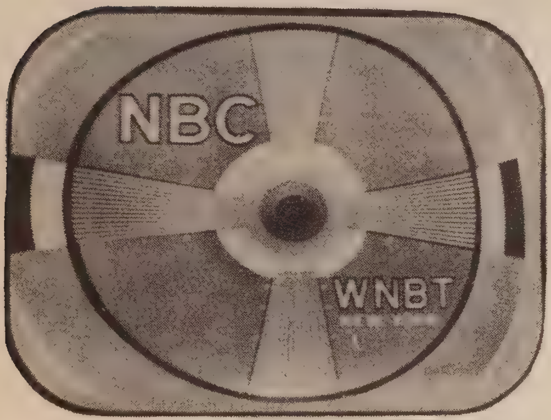
Figure 52—Width Control Misadjusted

→



PH108B



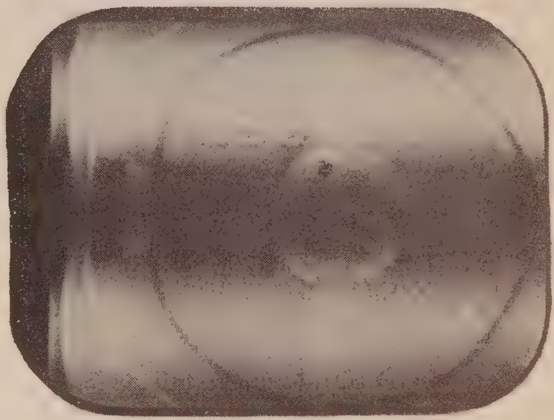
PH108C

Figure 53—Horizontal Drive Control Misadjusted

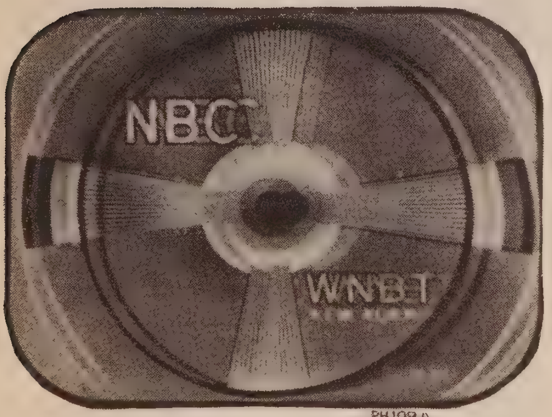
←

Figure 54—Hum in Video and Sync (Picture Off Center to Show Edge of Raster)

→



PH108D



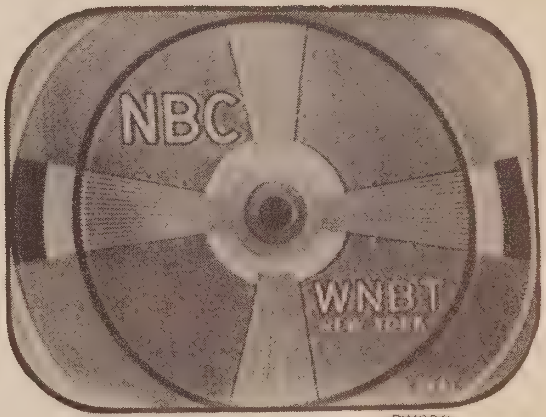
PH109 A

Figure 55—Reflections

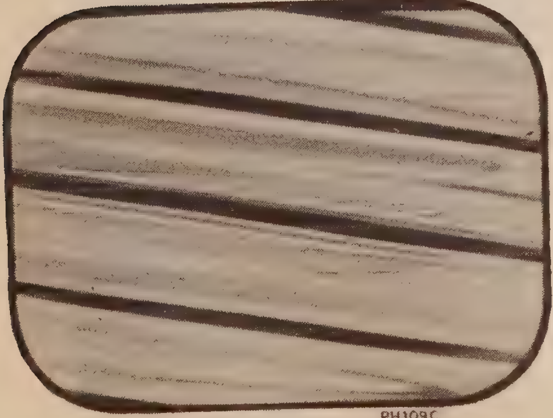
←

Figure 56—Transients

→



PH109B



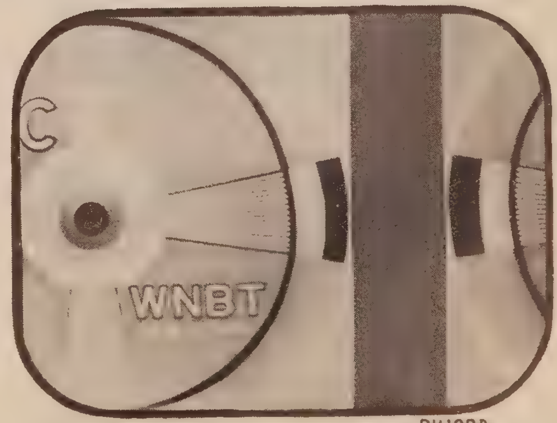
PH109C

Figure 57—Horizontal Sync Discriminator Transformer Frequency Adjustment Misadjusted

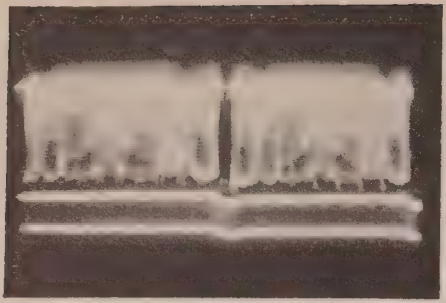
←

Figure 58—Horizontal Sync Discriminator Transformer Phase Adjustment Misadjusted

→



PH109D



CV26A

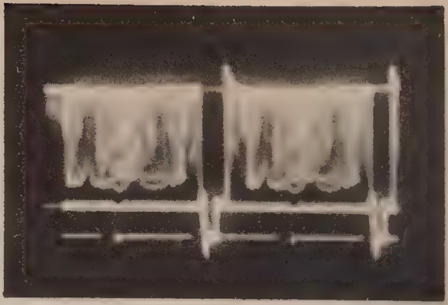
Video Signal Input to 1st Video Amplifier (Junction of L187, R136, L188 and C138)

Figure 59—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (1.5 Volts PP)

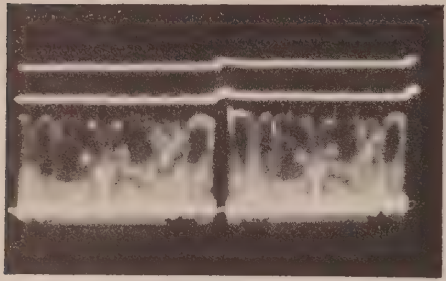
←

Figure 60—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (1.5 Volts PP)

→



CV26B



CV26C

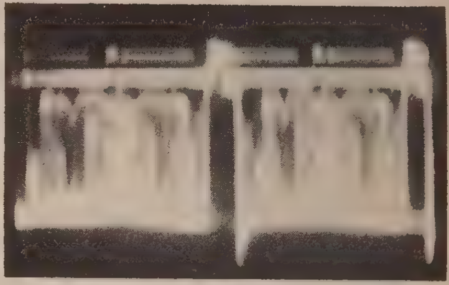
Output of 1st Video Amplifier (Junction of L189, R139, L190 and C140)

Figure 61—Vertical (10 Volts PP)

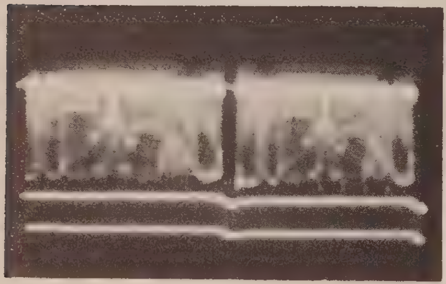
←

Figure 62—Horizontal (10 Volts PP)

→



CV26D



CV26E

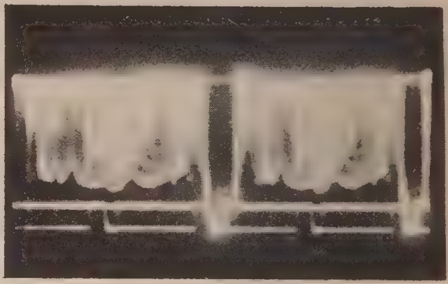
Input to Kinescope Grid (Junction of C141, R148 and Green Lead to Kinescope)

Figure 63—Vertical (38 Volts PP)

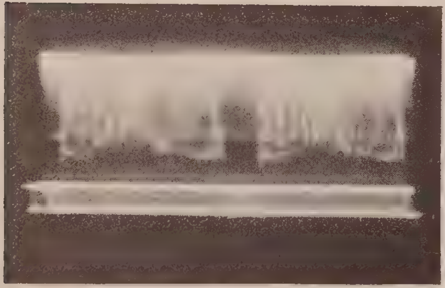
←

Figure 64—Horizontal (38 Volts PP)

→



CV26F



CV27A

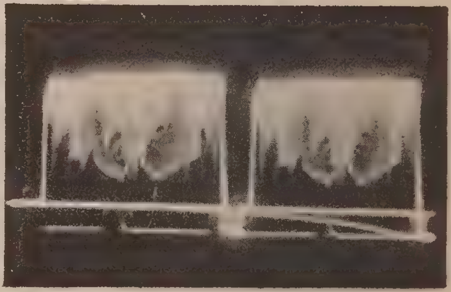
Cathode of D-C Restorer (Pin 5 of V114-B) (6AL5)

Figure 65—Vertical (36 Volts PP)

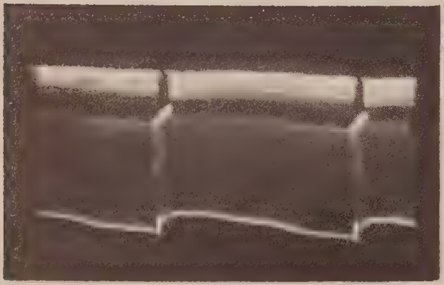
←

Figure 66—Horizontal (36 Volts PP)

→



CV27B



CV27C

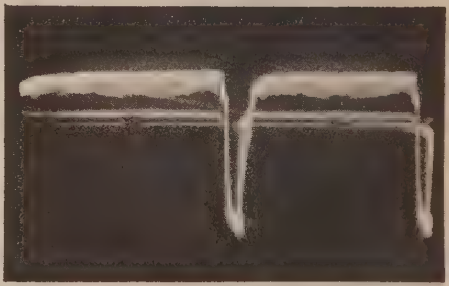
Plate of D-C Restorer (Pin 2 of V114-B) (6AL5)

Figure 67—Vertical (9 Volts PP)

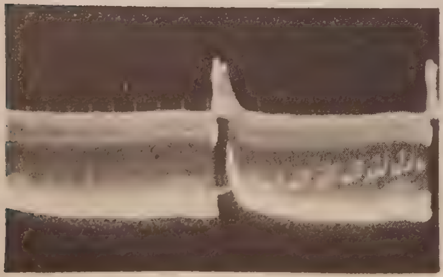
←

Figure 68—Horizontal (9 Volts PP)

→



CV27D



CV27E

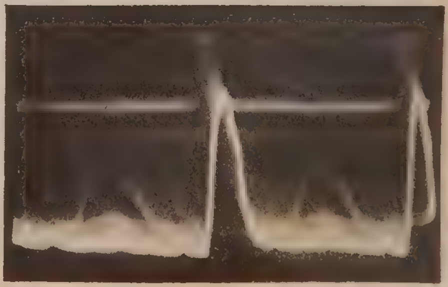
Output of 1st Sync. Amplifier (Pin 8 of V118) (6SK7)

Figure 69—Vertical (58 Volts PP)

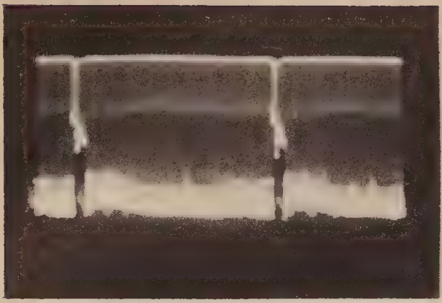
←

Figure 70—Horizontal (40 Volts PP)

→



CV27F

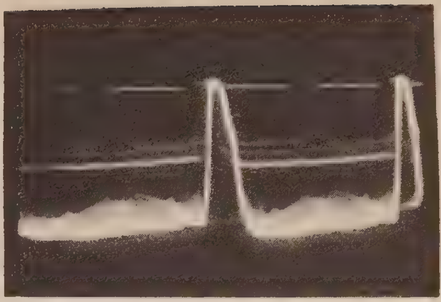


CV28A

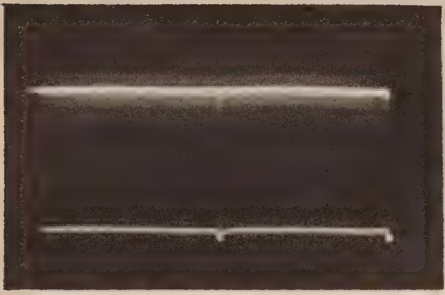
Input to Sync. Separator (Pin 4 of V119) (6SH7)

Figure 71—Vertical (35 Volts PP)
←

Figure 72—Horizontal (35 Volts PP)
→



CV28B

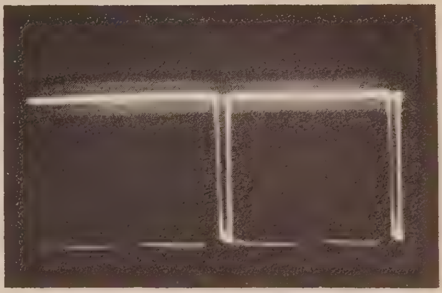


CV28C

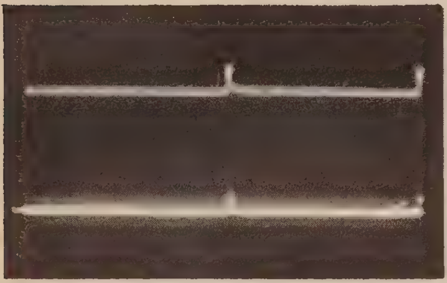
Output of Sync. Separator (Pin 8 of V119) (6SH7)

Figure 73—Vertical (75 Volts PP)
←

Figure 74—Horizontal (75 Volts PP)
→



CV28D

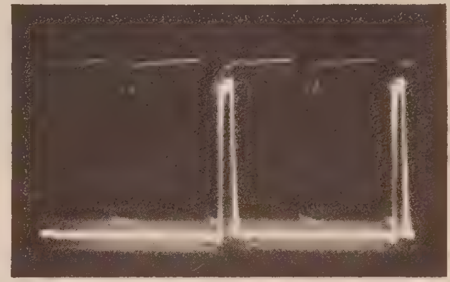


CV28E

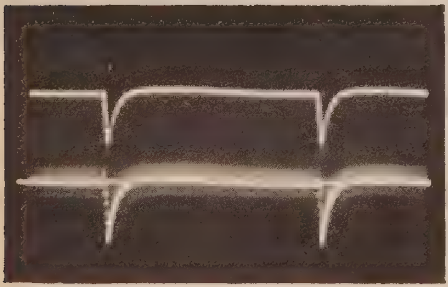
Output of 2nd Sync. Amplifier (Pin 2 of V120-A) (6SN7GT)

Figure 75—Vertical (35 Volts PP)
←

Figure 76—Horizontal (29 Volts PP)
→



CV28F

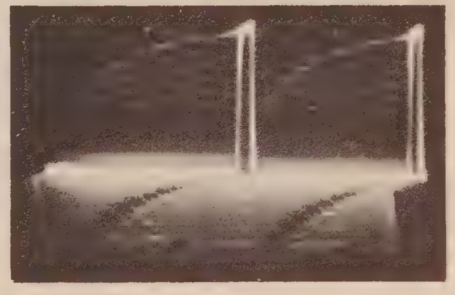


CV29A

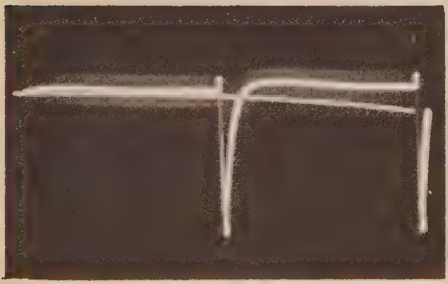
Input to Integrating Network (Junction of C149, R162 and R163)

Figure 77—Vertical (45 Volts PP)
←

Figure 78—Horizontal (30 Volts PP)
→



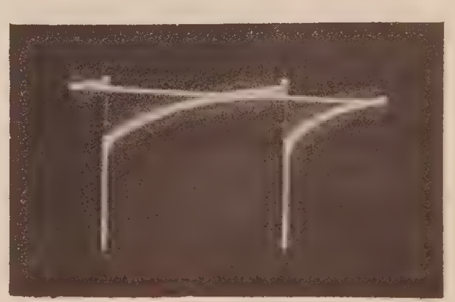
CV29B



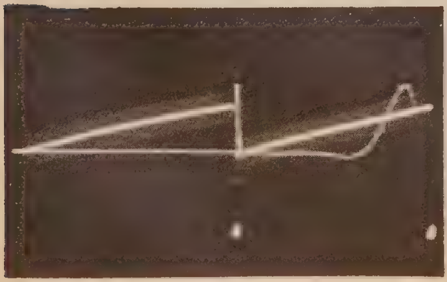
CV29C

Figure 79—Output of Integrating Network (Junction of R165, C153 and Yellow Lead of T106). Vertical (32 Volts PP)
←

Figure 80—Grid of Vertical Osc. (350 Volts PP) (Pin 5 of V121) (6J5)
→



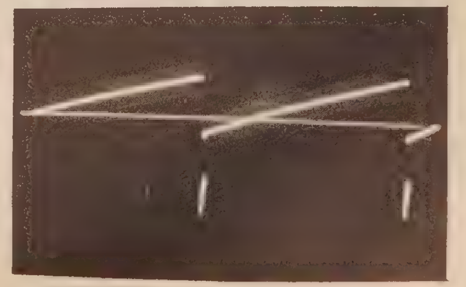
CV29D



CV29E

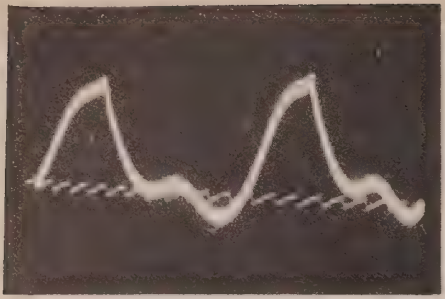
Figure 81—Plate of Vertical Osc. (140 Volts PP) (Pin 3 of V121) (6J5)
←

Figure 82—Input Coupling of Vertical Output (125 Volts PP) (Junction of C157, C158, R170 and Red Lead of T106)
→



CV29F

WAVEFORM PHOTOGRAPHS



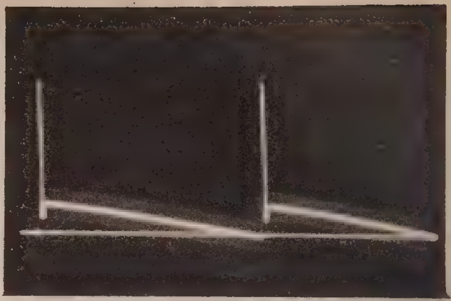
CV30A

Figure 83—Cathode of Vertical Output (.75 Volt PP) (Pin 8 of V122) (6K6GT)

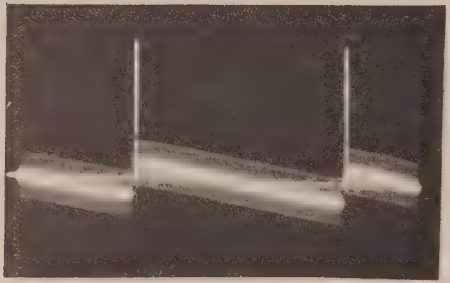
←

Figure 84—Plate of Vertical Output (700 Volts PP) (Pin 3 of V122) (6K6GT)

→



CV30B



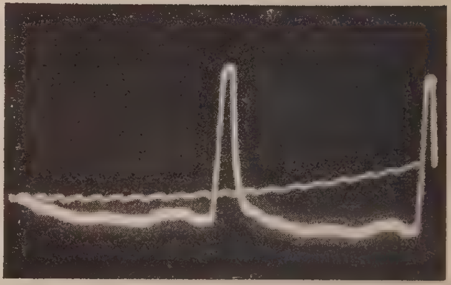
CV30C

Figure 85—Input to Vertical Deflection Coils (60 Volts PP) (Junction of Green Lead of T107 and Green Lead of Yoke)

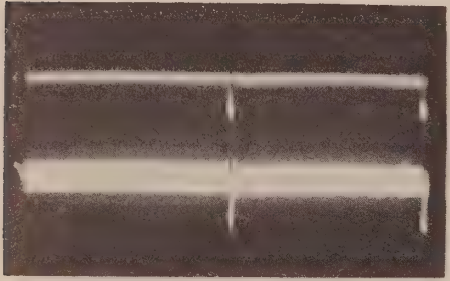
←

Figure 86—Vertical Boost of 1st Sync. Amplifier (16 Volts PP) (Junction of R154, R155 and C146)

→



CV30D



CV31A

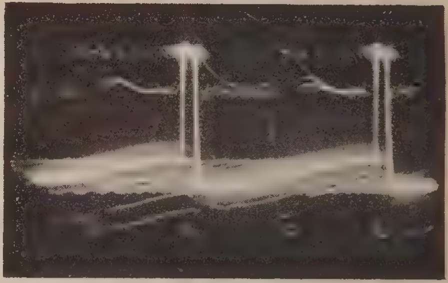
Terminal "E" of Sync Discriminator Transformer (T108)

Figure 87—Vertical (16 Volts PP)

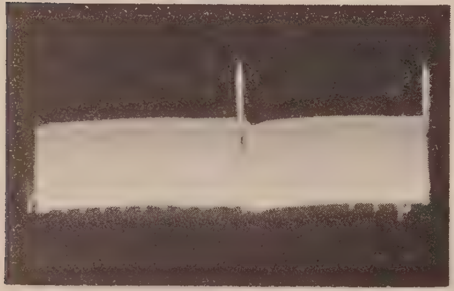
←

Figure 88—Horizontal (13 Volts PP)

→



CV31B



CV31C

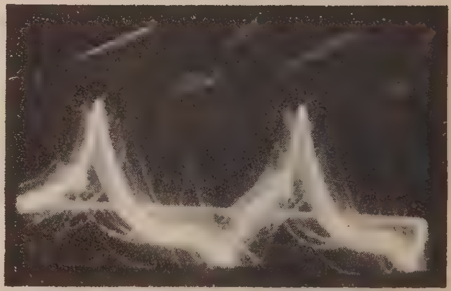
Junction of R191 and R192 (Cathode Resistors of Horizontal Sync. Discriminator)

Figure 89—Vertical (3 Volts PP)

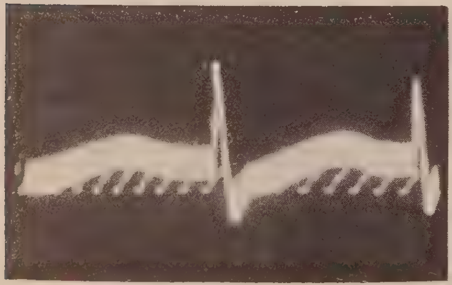
←

Figure 90—Horizontal (1.7 Volts PP)

→



CV31D



CV31E

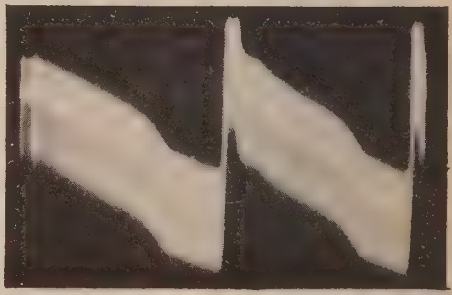
Cathode of Hor. Sync. Discriminator (Pin 1 of V123) (6AL5)

Figure 91—Vertical (.8 Volt PP)

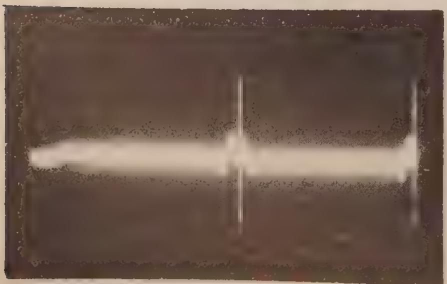
←

Figure 92—Horizontal (.15 Volt PP)

→



CV31F



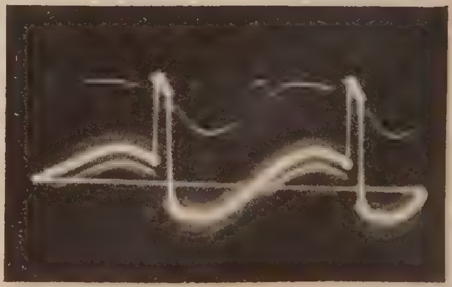
CV32A

Figure 93—Cathode of Hor. Sync. Discr. (Pin 5 of V123) (6AL5) Horizontal (.19 Volt PP)

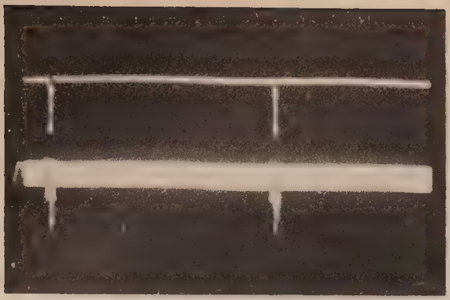
←

Figure 94—Plate of Hor. Sync. Discr. (Pin 7 of V123) (6AL5) Horizontal (23 Volts PP)

→



CV32C

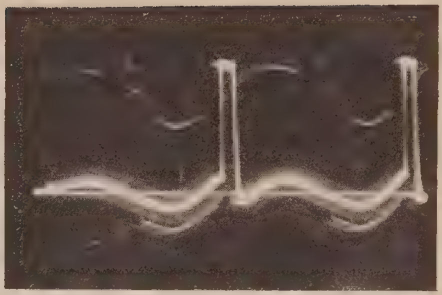


CV32D

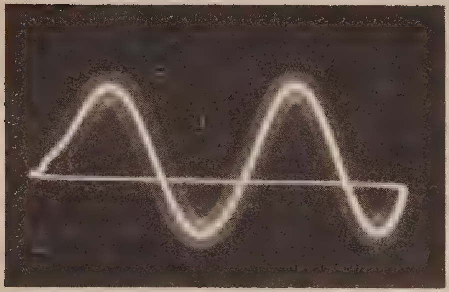
Plate of Hor. Sync. Discr. (Pin 2 of V123) (6AL5)

Figure 95—Vertical (21 Volts PP)
←

Figure 96—Horizontal (21 Volts PP)
→



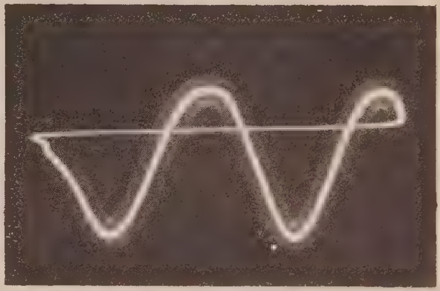
.V32E



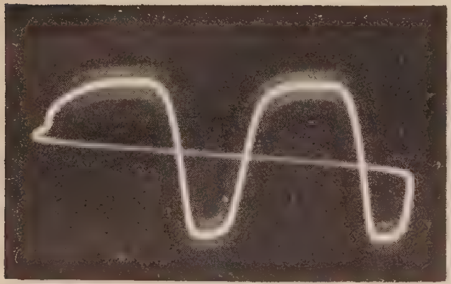
CV33A

Figure 97—Horizontal (95 Volts PP) Terminal "A" of Sync. Discriminator Transformer (T108)
←

Figure 98—Cathode of Horizontal Oscillator Control (1.5 Volts PP) (Pin 5 of V124) (6AC7)
→



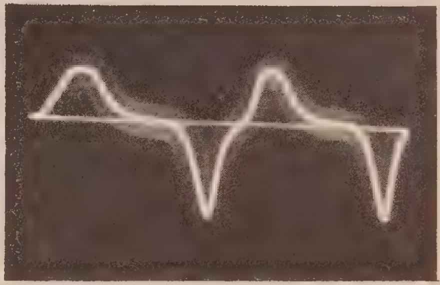
CV33B



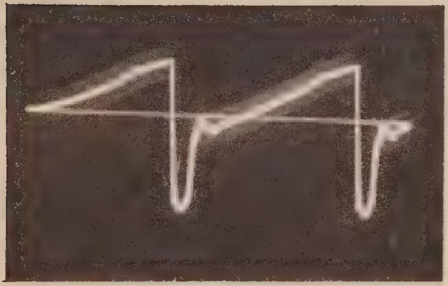
CV33C

Figure 99—Plate of Horizontal Oscillator (225 Volts PP) (Pin 3 of V125) (6K6GT)
←

Figure 100—Input of Hor. Discharge (100 Volts PP) (Junction of C176, C177 and R202)
→



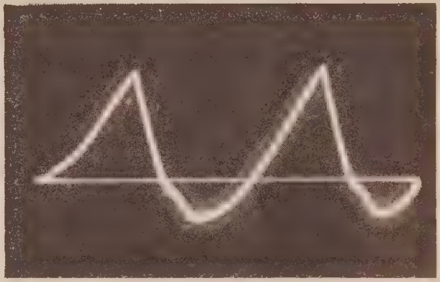
CV33D



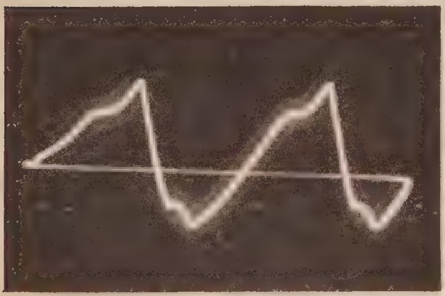
CV33E

Figure 101—Plate of Hor. Discharge (78 Volts PP) (Pin 5 of V120-B) (6SN7GT)
←

Figure 102—Cathode of Hor. Output (11.5 Volts PP) (Pin 3 of V126) (6BG6-G)
→



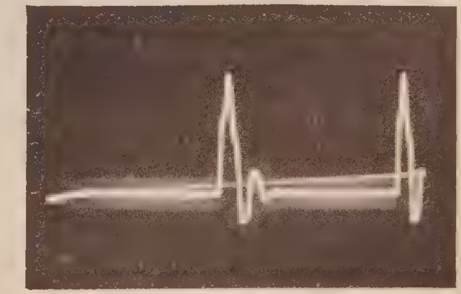
CV33F



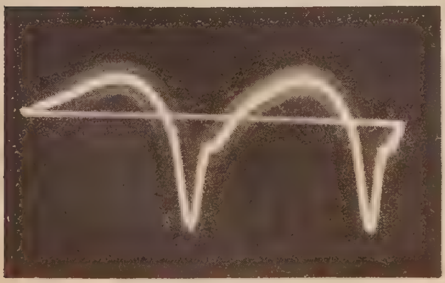
CV34A

Figure 103—Screen of Hor. Output (9 Volts PP) (Pin 8 of V126) (6BG6-G)
←

Figure 104—Plate of Horizontal Output (Approx. 6000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V126 to Ground)
→



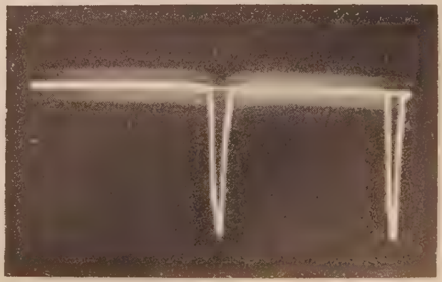
CV34B



CV34C

Figure 105—Cathode of Reaction Scanning (60 Volts PP) (Pin 8 of V128) (5V4G)
←

Figure 106—Input to Horizontal Deflection Coils (1325 Volts PP) (Pin 4 of V128) (5V4G)
→



CV34E

VOLTAGE CHART

Measurements made with receiver operating on 117 volts 60 cycles a-c and with no signal input except where otherwise indicated. Voltages shown are as read with Jr. VoltOhmyst between indicated terminal and chassis ground except where otherwise noted. Symbol < means "less than."

Tube No.	Tube Type	Function	Operating Condition **	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	R-F Amplifier	Pictr. Min.	1 & 2	130	—	—	7	0	5 & 6	-9.2	<.1*	—	*Per Plate
			Pictr. Max.	1 & 2	55	—	—	7	0	5 & 6	+.05	7.0*	—	*Per Plate
V2	6J6	Converter	Pictr. Min.	1 & 2	125	—	—	7	0	5 & 6	-3 to -6.	.5 to 4*	—	*Per Plate
			Pictr. Max.	1 & 2	100	—	—	7	0	5 & 6	-2 to -5.	.2 to 3*	—	*Per Plate
V3	6J6	R-F Oscillator	Pictr. Min.	1 & 2	108	—	—	7	.25	5 & 6	-4.5 to -6.5	2.5	—	
			Pictr. Max.	1 & 2	90	—	—	7	.15	5 & 6	-3.5 to -5.	1.7	—	
V104	6BA6	1st Sound I-F Amplifier	Pictr. Min.	5	120	6	120	7	1.9	1	0	12.0	5.0	
			Pictr. Max.	5	110	6	110	7	1.6	1	0	10.5	4.5	
V105	6BA6	2d Sound I-F Amplifier	Pictr. Min.	5	122	6	118	7	1.9	1	0	12.5	4.9	
			Pictr. Max.	5	113	6	108	7	1.6	1	0	10.5	4.2	
V106	6AU6	3d Sound I-F Amplifier	Pictr. Min.	5	48	6	48	7	0	1	-.5	3.3	1.4	
			Pictr. Max.	5	41	6	41	7	0	1	-.5	2.8	1.2	
V107	6AL5	Sound Discrim.	Pictr. Min.	2 & 7	-.35	—	—	4 & 5	—	—	—	—	—	
			Pictr. Max.	2 & 7	-.45	—	—	4 & 5	—	—	—	—	—	
V108	6AT6	1st Audio Amplifier	Pictr. Min.	7	80	—	—	2	0	1	-.75	.5	—	
V109	6K6-GT	Audio Output	Pictr. Min.	3	253	4	265	8	0	5	-18	27.5	4.0	
V110	6AG5	1st Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	109	6	109	2 & 7	.26	1	-1.0	5.5	.9	
V111	6AG5	2d Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	113	6	113	2 & 7	.26	1	-1.0	5.6	.9	
V112	6AG5	3d Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	98	6	117	2 & 7	.26	1	-1.0	5.7	.9	
V113	6AG5	4th Pix. I-F Amplifier	Pictr. Min.	5	99	6	127	2 & 7	1.2	1	0	6.8	1.7	
			Pictr. Max.	5	89	6	117	2 & 7	1.1	1	0	6.8	1.7	
V114-A	6AL5	Picture 2d Det.	Pictr. Min.	7	-.1	—	—	1	0	—	—	—	—	
V114-B	6AL5	DC Restorer	Brightness Min.	2	-100	—	—	5	-90	—	—	—	—	
			Brightness Max.	2	-1	—	—	5	-.9	—	—	—	—	
V115	6AU6	1st Video Amplifier	Pictr. Min.	5	240	6	135	7	0	1	-2.15	4.0	1.55	
			Pictr. Max.	5	255	6	125	7	0	1	-2.2	2.8	1.05	
V116	6K6-GT	2d Video Amplifier	Pictr. Min.	3	105	4	135	8	3.7	5	-7.5	9.6	1.6	
			Pictr. Max.	3	95	4	125	8	2.9	5	-7.5	7.5	1.3	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition **	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V117	10-BP4	Kinescope	Brightness Min.	Cap	9200*	10	275	11	0	2	–100	0	0	*Measured with VoltOhmyst and high voltage multiplier probe
			Brightness Max.	Cap	6000*	10	275	11	0	2	0	.7	—	
			Brightness Average	Cap	9000*	10	275	—	—	—	—	.05	—	
V118	6SK7	1st Sync. Amplifier	Pictr. Min.	8	163	6	129	5	0	4	–4.3	11.5	3.8	
			Pictr. Max.	8	185	6	115	5	0	4	–4.4	9.2	2.9	
V119	6SH7	Sync. Separator	Pictr. Min.	8	134	6	135	5	0	4	–5.2	.1	.05	
			Pictr. Max.	8	123	6	125	5	0	4	–9*	.3	.1	*Depends on noise
V120-A	6SN7 GT	2d Sync. Amplifier	Pictr. Min.	2	88	—	—	3	0	1	–.5	9.0	—	
			Pictr. Max.	2	80	—	—	3	0	1	–9*	7.9	—	*Depends on noise
V120-B	6SN7 GT	Horizontal Discharge	Pictr. Min.	5	–37	—	—	6	–100	4	–140	.5	—	
V121	6J5	Vertical Oscillator	Pictr. Min.	3	70*	—	—	8	–100	5	–150	.15	—	*Height, linearity and hold affect readings 2 to 1
V122	6K6-GT	Vertical Output	Pictr. Min.	3	180	4	180*	8	–70	5	–100	9.0	*	*Screen connected to plate
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 & 7	–6.5	—	—	1 & 5	–2.1	—	—	—	—	
V124	6AC7	Horizontal Osc. Control	Pictr. Min.	8	194	6	105	5	.05	4	–2.0	3.8	1.1	
V125	6K6-GT	Horizontal Oscillator	Hold Max. Resistance	3	190	4	208	8	0	5	–30	17.0	6.7	
			Hold Min. Resistance	3	180	4	194	8	0	5	–23.5	19.5	8.2	
V126	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	134	3	–95	5	–113	77.0	11.5	* 6000 volt pulse present
V127	8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	9200	—	—	0	—	*9200 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	6700	—	—	.7	—	*9200 volt pulse present
V128	5V4G	Reaction Scanning	Pictr. Min.	4 & 6	Do not Meas.*	—	—	8	350	—	—	90	—	* 1200 volt pulse present
V129	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	300	—	—	146	—	*A-C measured from plate to trans center tap
V130	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	300	—	—	146	—	

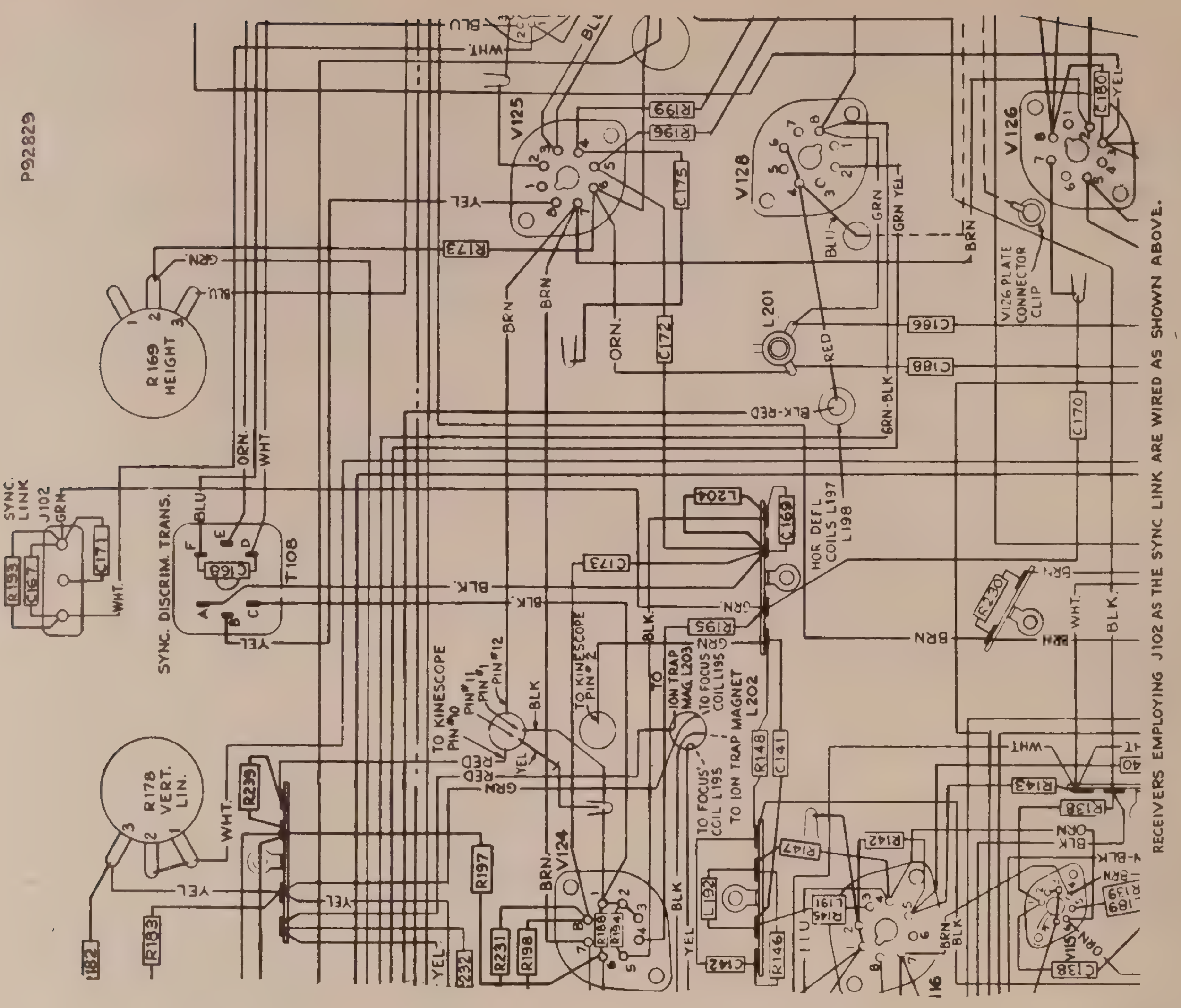
** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

Following readings taken with video signal applied through video amplifiers to produce 25 volts peaks to peak on Kinescope grid.

V114-B	6AL5	DC Restorer	Pictr. Min.	2	–41	—	—	5	–27	—	—	—	—	
V119	6SH7	Sync. Separator	Pictr. Min.	8	136	6	142	5	0	4	–21.5	.9	.8	
V120-A	6SN-7GT	2d Sync. Amplifier	Pictr. Min.	2	88	—	—	3	0	1	–5.4	9.0	—	
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 & 7	–20	—	—	1 & 5	K_1 * K_5 –2.1	—	—	—	—	*See grid voltage of V124
V124	6AC7	Horizontal Osc. Control	Pull-in*	8	200(a)	6	100(b)	5	<.1	4	–1.5 to –3	<8.	<2.5	*Varying Hor. Osc. tuning
			Hold*	8	200(c)	6	100(d)	5	<.1	4	(e)	<8.	<2.5	

(a) Pull-in range varies with tubes from 110-210 to 195-270.
(b) Pull-in range varies with tubes from 80-100 to 100-115.
(c) Hold range varies with tubes from 110-270 to 140-270.
(d) Hold range varies with tubes from 80-115 to 90-115.
(e) Hold range varies with tubes from 1.5-7.0 to 1.-4.5.

R-F UNIT WIRING DIAGRAM


P92829
R169 HEIGHT
R178 VERT. LIN.
SYNC. LINK J102
SYNC. DISCRIM. TRANS. T108
V124
V125
V126
V128
L201
HOR DEFL COILS L197 L198
ION TRAP MAG. L203
TO FOCUS COIL L195
TO ION TRAP MAGNET L202
TO KINESCOPE PIN #10
TO KINESCOPE PIN #2
V126 PLATE CONNECTOR CLIP
RECEIVERS EMPLOYING J102 AS THE SYNC LINK ARE WIRED AS SHOWN ABOVE.

Partial Chassis Wiring Diagram
(Alternate Connections of J102)
See following page for complete wiring

Note: In some units C19 is omitted.

In some units C14 is fixed.

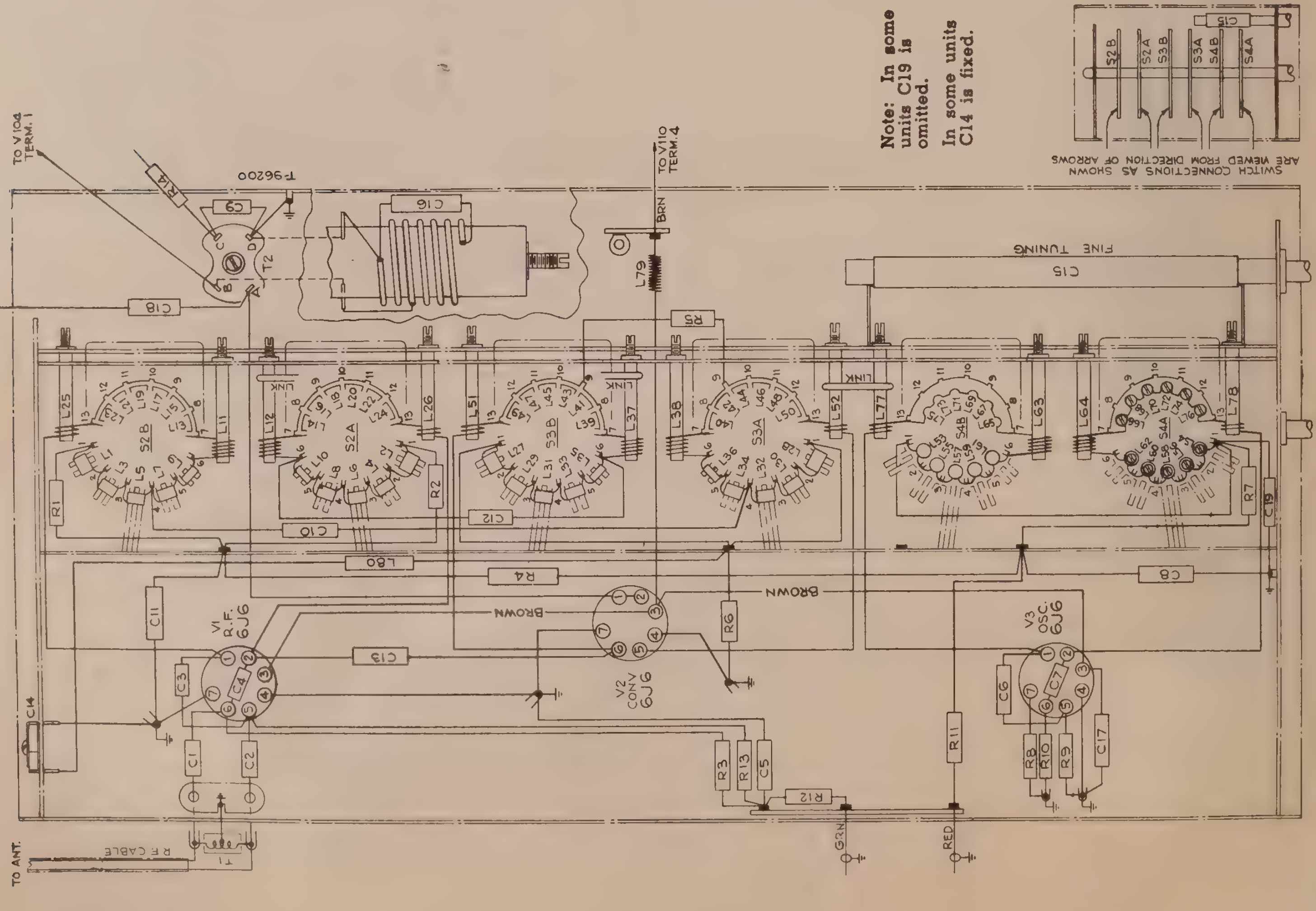
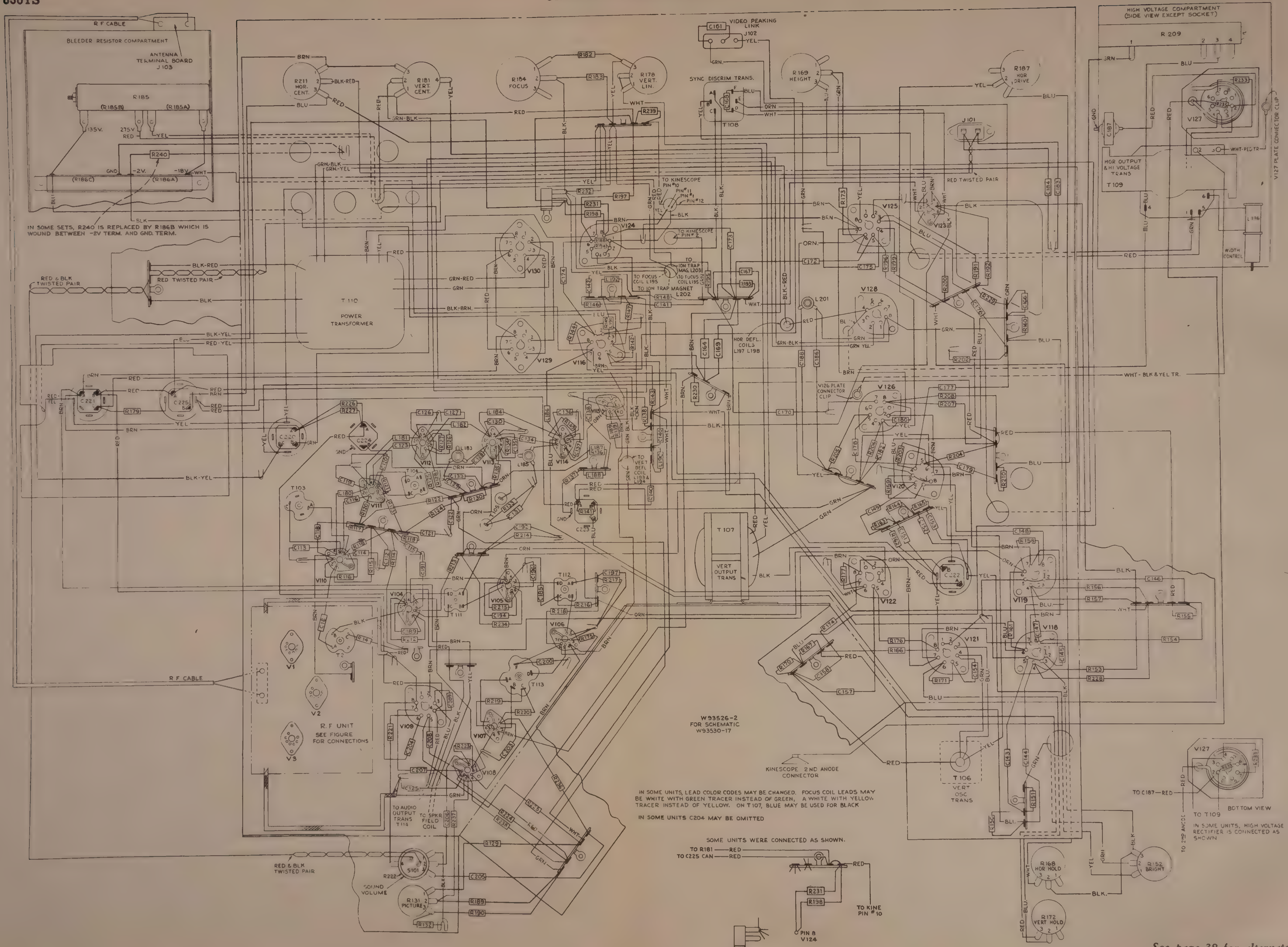

T-96200
TO V104 TERM. 1
TO V110 TERM. 4
TO ANT.
R F CABLE
V1 R.F. 6J6
V2 CONV 6J6
V3 OSC. 6J6
S2B
S2A
S3B
S3A
S4B
S4A
C15
FINE TUNING
LINK
BROWN
GRN
RED
SWITCH CONNECTIONS AS SHOWN ARE VIEWED FROM DIRECTION OF ARROWS

Figure 107—R-F Unit Wiring Diagram

CHASSIS WIRING DIAGRAM


R F CABLE
BLEEDER RESISTOR COMPARTMENT
ANTENNA TERMINAL BOARD J 103
R185
(R185B)
(R185A)
135V.
275V
GND
-2V.
-18V
(R186C)
(R186A)
R240
R211 HOR. CENT.
R181 VERT. CENT.
R184 FOCUS
R178 VERT. LIN.
VIDEO PEAKING LINK
J102
SYNC DISCRIM TRANS.
T108
R169 HEIGHT
R187 HOR DRIVE
HIGH VOLTAGE COMPARTMENT (SIDE VIEW EXCEPT SOCKET)
R 209
V127
J101
RED TWISTED PAIR
HOR OUTPUT & HI VOLTAGE TRANS
T 109
V127 PLATE CONNECTOR CLIP
WIDTH CONTROL
RED & BLK TWISTED PAIR
T 110 POWER TRANSFORMER
V130
V129
V124
V116
V125
V123
V128
L 201
HOR DEFL. COILS L197 L198
TO KINESCOPE PIN #10
TO KINESCOPE PIN #2
TO ION TRAP MAG. L203
TO FOCUS COIL L195
TO ION TRAP MAGNET L202
V126
V126 PLATE CONNECTOR CLIP
V120
V122
V119
V121
V118
T 107 VERT OUTPUT TRANS
TO VERT DEFL COIL L193 L194
V111
V110
V112
V113
V114
V115
T103
T104
T105
T112
T111
T113
V104
V105
V106
V107
V108
V109
V1
V2
V3
R.F UNIT SEE FIGURE FOR CONNECTIONS
TO AUDIO OUTPUT TRANS T114
TO SPKR FIELD COIL
S101
SOUND VOLUME
R131 PICTURE
T 106 VERT OSC TRANS
R168 HOR HOLD
R172 VERT HOLD
R152 BRIGHT
W 93526-2 FOR SCHEMATIC W93530-17
KINESCOPE 2ND ANODE CONNECTOR
TO R181 —RED
TO C225 CAN —RED
TO KINE PIN #10
PIN 8 V124
V127
BOTTOM VIEW
TO C187—RED
TO T109
TO 2ND ANODE

IN SOME SETS, R240 IS REPLACED BY R186B WHICH IS WOUND BETWEEN -2V TERM. AND GND. TERM.

IN SOME UNITS, LEAD COLOR CODES MAY BE CHANGED. FOCUS COIL LEADS MAY BE WHITE WITH GREEN TRACER INSTEAD OF GREEN, A WHITE WITH YELLOW TRACER INSTEAD OF YELLOW. ON T107, BLUE MAY BE USED FOR BLACK

IN SOME UNITS C204 MAY BE OMITTED

SOME UNITS WERE CONNECTED AS SHOWN.

IN SOME UNITS, HIGH VOLTAGE RECTIFIER IS CONNECTED AS SHOWN

See page 38 for alternate wiring of J102

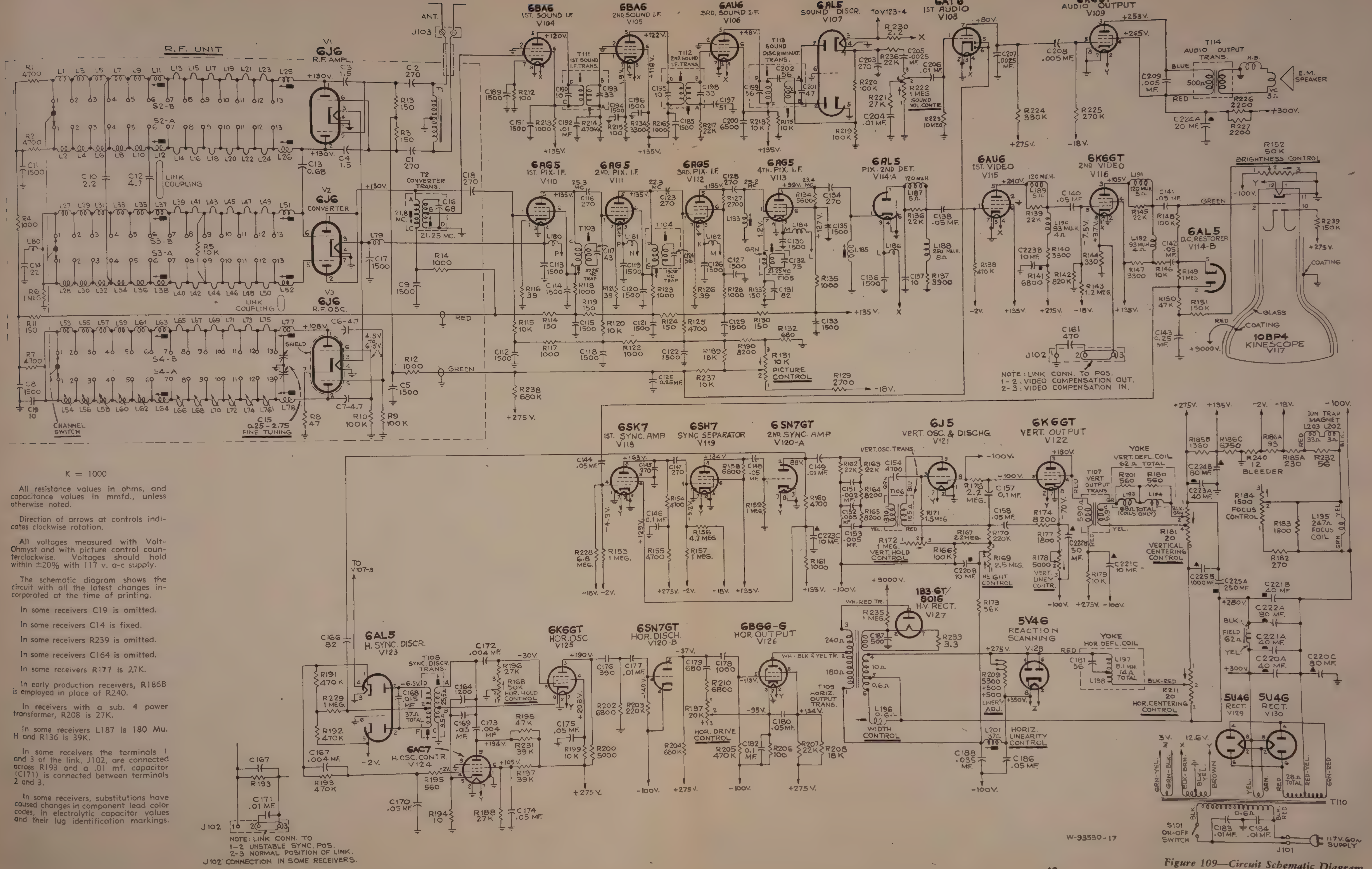
Figure 108—Chassis Wiring Diagram

REPLACEMENT PARTS

STOCK NO.	DESCRIPTION
	R.F. UNIT ASSEMBLY
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
65401	Capacitor—Mica, 270 mmf. (C18)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
71501	Capacitor—Ceramic, 1500 mmf (C5. C8, C9, C11, C17)
72122	Coil—Channel #1 front and rear converter grid coil and channel #1 front and rear r-f amplifier plate coil (L1, L2, L27, L28)
71469	Coil—Channel #1 front or rear osc. coil (L53, L54)
71480	Coil—Channels #4 front and rear r-f amplifier plate coils (L7, L8)
71470	Coil—Channel #2 front, channel #3 front and channel #4 front oscillator coil (L56, L58, L60)
71479	Coil—Channel #2 front and rear, channel #4 front and rear converter grid coils, channel #2 front and rear, channel #3 front and rear r-f amplifier plate coils (L3, L4, L5, L6, L29, L30, L33, L34)
72597	Coil—Channel #3 front and rear converter grid coils (L31, L32)
72552	Coil—Channel #3 rear oscillator coil (L57)
72553	Coil—Channel #4 rear oscillator coil (L59)
71472	Coil—Channel #5 rear oscillator coil (L61)
71481	Coil—Channel #5 front and rear converter grid coils, channel #5 front and rear r-f amplifier coils (L9, L10, L35, L36)
71471	Coil—Channel #5 front, and channel #2 rear oscillator coil (L55, L62)
71492	Coil—Channel #6 front and rear oscillator, converter grid and r-f amplifier plate coils (L11, L12, L37, L38, L63, L64)
71488	Coil—Channel #13 front oscillator coil (L78)
71489	Coil—Channel #13 rear oscillator coil (L77)
71490	Coil—Channel #13 front converter grid and r-f amplifier plate coil (L26, L52)
71491	Coil—Channel #13 rear converter grid and r-f amplifier plate coil (L25, L51)
71506	Coil—Converter grid trap coil (L80)
71505	Coil—Heater choke coil (L79)
71493	Connector—Segment connector
71497	Core—Channel #6 oscillator coil adjustable core
71498	Core—Channels #6 and #13 converter grid and r-f amplifier coils adjustable core
71597	Core—Channel #13 oscillator coils adjustable core
71463	Detent—R-Funit detent mechanism and fiber shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for channels #6 and #13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
30732	Resistor—47 ohms, ½ watt (R8)
30880	Resistor—150 ohms, ½ watt (R3, R11, R13)
34766	Resistor—1000 ohms, ½ watt (R4, R12, R14)
30494	Resistor—4700 ohms, ½ watt (R1, R2, R7)
3078	Resistor—10,000 ohms, ½ watt (R5)
3252	Resistor—100,000 ohms, ½ watt (R9, R10)
30652	Resistor— 1 megohm, ½ wtt (R6)
14343	Ring—Retainer ring for drive
71475	Screw—#4-40 x .296 adjusting screw for coils L54 L56, L58, L60, L62
71476	Screw—#4-40 x¼" binder head screw for adjusting coils L66, L68, L70, L72, L74, L76
71473	Segment—Converter grid and r-f amplifier plate front section's segment less coils (Part of S2, S3)
71474	Segment—Converter grid and r-f amplifier plate section's segment less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment less coils (Part of S4)
71468	Segment—Oscillator section rear segment less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket, miniature
71461	Spring—Snap spring to hold fine tuning shaft
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer—Converter transformer (T2, C16)

STOCK NO.	DESCRIPTION
	TELEVISION CHASSIS ASSEMBLIES KCS 20A-1
71894	Bearing—Bearing for r-f unit shaft
71460	Board—"Antenna" terminal board (J103)
71454	Board—Sync Link terminal board, 3 terminals with link (J102)
71524	Cable—R-F cable (from r-f unit to J103)
71532	Cap—Hi-voltage rectifier and horizontal output plate cap
39604	Capacitor—Mica, 10 mmf. (C137)
71771	Capacitor—Ceramic, 51 mmf. (C197)
73090	Capacitor—Mica, 82 mmf., 1000 volts (C166)
71514	Capacitor—Ceramic, 82 mmf. (C131)
73091	Capacitor—Mica, 270 mmf., 1000 volts (C116, C123, C128, C134, C145, C147, C203)
39642	Capacitor—Mica, 390 mmf. (C176)
39644	Capacitor—Mica, 470 mmf. (C161), in some receivers
71450	Capacitor—Hi-voltage filter, 500 mmf. (C187)
39648	Capacitor—Mica, 680 mmf. (C179)
72638	Capacitor—Ceramic, 1200 mmf. (C164), in some receivers
71501	Capacitor—Ceramic, 1500 mmf. (C112, C113, C114, C115, C118, C119, C120, C121, C122, C126, C127, C129, C130, C133, C135, C136, C185, C189, C191, C194, C196)
39668	Capacitor—Mica, 4700 mmf. (C154)
71690	Capacitor—Ceramic, 6500 mmf. (C200)
70642	Capacitor—Tubular, .001 mfd., 1000 volts (C178)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C151)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C205, C207)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C172)
70647	Capacitor—Tubular, .004 mfd., 1000 volts (C167, C173)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C152, C153, C208)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C209)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C149, C171, C177, C192, C204, C206)
71770	Capacitor—Moulded paper, .01 mfd., 400 volts (C183, C184)
71516	Capacitor—Tubular, impregnated, .015 mfd., 400 volts (C168, C169)
73100	Capacitor—Tubular, impregnated, .035 mfd., 1000 volts (C188)
71515	Capacitor—Tubular, impregnated, .05 mfd., 600 volts (C158)
73093	Capacitor—Tubular, impregnated, .05 mfd., 1000 volts (C186)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C138, C144, C148, C170, C180)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C140, C141, C142, C174, C175)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C157, C182)
70638	Capacitor—Tubular, .1 mfd., 600 volts (C146)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C125, C143)
71435	Capacitor—Electrolytic, comprising 20 mfd., 450 volts and 80 mfd., 350 volts (C224a, C224b)
71434	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 10 mfd., 450 volts and 10 mfd., 350 volts (C223a, C223b, C223c)
71431	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 10 mfd., 450 volts and 80 mfd., 150 volts (C220a, C220b, C220c)
71432	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 40 mfd., 450 volts and 10 mfd., 450 volts (C221a, C221b, C221c)
71433	Capacitor—Electrolytic, comprising 80 mfd., 450 volts and 50 mfd., 50 volts (C222a, C222b)
71436	Capacitor—Electrolytic, comprising 250 mfd., 10 volts and 1000 mfd., 6 volts (C225a, C225b)
71426	Coil—Third or fourth picture i-f coil (L183, L185)
71505	Coil—Choke coil (L180, L181, L182, L184, L186)
71421	Coil—Focus coil (L195)
71449	Coil—Horizontal linearity control coil (L201)
71527	Coil—Peaking coil, 90 mu. h. (L190, L192)
71529	Coil—Peaking coil, 120 mu. h. (L187, L189, L191, R136, R139, R145)
71526	Coil—Peaking coil, 250 mu. h. (L188)
71429	Coil—Width control coil (L196)
71523	Connector—Kinescope anode connector
71521	Connector—Hi-voltage capacitor connector
71444	Control—Brightness control (R152)

CIRCUIT SCHEMATIC DIAGRAM


R.F. UNIT
ANT.
J103
V1 6J6 R.F. AMPL.
V2 6J6 CONVERTER
V3 6J6 R.F. OSC.
T1
T2 CONVERTER TRANS.
LINK COUPLING
CHANNEL SWITCH
C15 0.25-2.75 FINE TUNING
SHIELD
6BA6 1ST. SOUND I.F. V104
6BA6 2ND. SOUND I.F. V105
6AU6 3RD. SOUND I.F. V106
6AL5 SOUND DISCR. V107
6AT6 1ST AUDIO V108
6K6GT AUDIO OUTPUT V109
T111 1ST SOUND I.F. TRANS.
T112 2ND SOUND I.F. TRANS.
T113 SOUND DISCRIMINAT. TRANS.
TO V123-4
R222 1 MEG SOUND VOL. CONTR.
T114 AUDIO OUTPUT TRANS.
E.M. SPEAKER
6AG5 1ST. PIX. I.F. V110
6AG5 2ND. PIX. I.F. V111
6AG5 3RD. PIX. I.F. V112
6AG5 4TH. PIX. I.F. V113
6AL5 PIX. 2ND DET. V114-A
6AU6 1ST. VIDEO V115
6K6GT 2ND. VIDEO V116
6AL5 D.C. RESTORER V114-B
R152 50 K BRIGHTNESS CONTROL
10BP4 KINESCOPE V117
GLASS
COATING
R131 10 K PICTURE CONTROL
J102
NOTE: LINK CONN. TO POS. 1-2: VIDEO COMPENSATION OUT. 2-3: VIDEO COMPENSATION IN.
6SK7 1ST. SYNC. AMP. V118
6SH7 SYNC SEPARATOR V119
6SN7GT 2ND. SYNC. AMP. V120-A
6J5 VERT. OSC. & DISCHG. V121
6K6GT VERT. OUTPUT V122
VERT. OSC. TRANS.
R172 1 MEG. VERT. HOLD CONTROL
R169 2.5 MEG. HEIGHT CONTROL
R178 5000 VERT. LINEARITY CONTR.
T107 VERT. OUTPUT TRANS.
YOKE VERT. DEFL. COIL 62Ω TOTAL
R181 20 VERTICAL CENTERING CONTROL
ION TRAP MAGNET
BLEEDER
R184 1500 FOCUS CONTROL
L195 247Ω FOCUS COIL
TO V107-3
6AL5 H. SYNC. DISCR. V123
T108 SYNC. DISCR. TRANS.
6K6GT HOR. OSC. V125
R168 50K HOR. HOLD CONTROL
6AC7 H. OSC. CONTR. V124
6SN7GT HOR. DISCH. V120-B
6BG6-G HOR. OUTPUT V126
1B3-GT/8016 H.V. RECT. V127
T109 HORIZ. OUTPUT TRANS.
R187 20K HOR. DRIVE CONTROL
L196 WIDTH CONTROL
5V4G REACTION SCANNING V128
LINEARITY ADJ.
L201 HORIZ. LINEARITY CONTROL
YOKE HOR. DEFL. COIL
R211 20 HOR. CENTERING CONTROL
5U4G RECT. V129
5U4G RECT. V130
T110
S101 ON-OFF SWITCH
J101
117V. 60~ SUPPLY
NOTE: LINK CONN. TO 1-2 UNSTABLE SYNC. POS. 2-3 NORMAL POSITION OF LINK.
J102 CONNECTION IN SOME RECEIVERS.
W-93530-17

K = 1000

All resistance values in ohms, and capacitance values in mmfd., unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with Volt-Ohmyst and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

The schematic diagram shows the circuit with all the latest changes incorporated at the time of printing.

In some receivers C19 is omitted.

In some receivers C14 is fixed.

In some receivers R239 is omitted.

In some receivers C164 is omitted.

In some receivers R177 is 2.7K.

In early production receivers, R186B is employed in place of R240.

In receivers with a sub. 4 power transformer, R208 is 27K.

In some receivers L187 is 180 Mu. H and R136 is 39K.

In some receivers the terminals 1 and 3 of the link, J102, are connected across R193 and a .01 mf. capacitor (C171) is connected between terminals 2 and 3.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

Figure 109—Circuit Schematic Diagram

Replacements Parts (Continued)

STOCK No.	DESCRIPTION
71446	Control—Picture and sound volume control and power switch (R131, R222, S101)
71442	Control—Focus control (R184)
71447	Control—Horizontal drive control (R187)
72758	Control—Vertical and horizontal hold control (R168, R172)
71443	Control—Vertical or horizontal centering control (R181, R211)
71440	Control—Height control (R169)
71441	Control—Vertical linearity control (R178)
71457	Cord—Power cord
71437	Cover—Insulating cover for electrolytics #71431 and #71433
71510	Cushion—Deflection yoke hood bottom cushion
71509	Cushion—Deflection yoke hood upper cushion
71522	Magnet—Ion trap magnet (L202, L203)
71451	Nut—Speed nut to mount capacitor #71450
71455	Nut—Wing nut for mounting of focus coil (3 required)
18469	Plate—Mounting plate for electrolytics #71431 and #71433
71448	Plug—2 prong male plug for power cable (J101)
71918	Resistor—2.2 ohms, 1 watt (R230)
71513	Resistor—3.3 ohms, ⅓ watt (R233)
34761	Resistor—10 ohms, ½ watt (R194)
73098	Resistor—Wire wound, 12 ohms, 1 watt (R240) (Replaces R186b in late production receivers)
11956	Resistor—39 ohms, ½ watt (R116, R121, R126)
71992	Resistor—56 ohms, 1 watt (R232)
34765	Resistor—100 ohms, ½ watt (R212, R215)
48927	Resistor—100 ohms, 2 watt (R206)
30880	Resistor—150 ohms, ½ watt (R114, R119, R124, R130, R133)
71511	Resistor—270 ohms, 2 watt (R182)
8063	Resistor—330 ohms, ½ watt (R144)
5164	Resistor—560 ohms, ½ watt (R195)
12262	Resistor—680 ohms, ½ watt (R132)
34766	Resistor—1000 ohms, ½ watt (R117, R118, R122, R123, R128, R135, R161, R213, R216)
71458	Resistor—Wire wound resistor, 1360 ohms, 17 watt, and 230 ohms, 10 watt (R185a, R185b)
30930	Resistor—1800 ohms, ½ watt (R177)
71512	Resistor—1800 ohms, 1 watt (R183)
34769	Resistor—2200 ohms, 2 watt (R226, R227)
30730	Resistor—2700 ohms, ½ watt (R127, R129)
30733	Resistor—3300 ohms, ½ watt (R140, R234)
71986	Resistor—3300 ohms, 1 watt (R147)
30694	Resistor—3900 ohms, ½ watt (R137)
71987	Resistor—4700 ohms, 1 watt (R154, R155)
30494	Resistor—4700 ohms, ½ watt (R125, R160)
45876	Resistor—5000 ohms, 5 watt (R200)
71439	Resistor—Wire wound resistor, 5300 ohms, 20 watt; 500 ohms, 2 watt and 500 ohms, 2 watt (R209)
30734	Resistor—5600 ohms, ½ watt (R134)
71459	Resistor—Voltage divider resistor, 6750 ohms, 3.2 watt; 12 ohms, 0.5 watt and 93 ohms, 4 watt (R186a, R186b, R186c) (in early receivers)
73097	Resistor—Voltage divider resistor, 6750 ohms, 3.2 watt; and 93 ohms, 4 watt (R186a, R186c) (in late production receivers)
14659	Resistor—6800 ohms, ½ watt (R141, R158, R202, R210)
14250	Resistor—8200 ohms, ½ watt (R164, R165, R174, R190)
71914	Resistor—10,000 ohms, 1 watt (R179, R199, R218)
3078	Resistor—10,000 ohms, ½ watt (R115, R120, R146, R175, R237)
3219	Resistor—18,000 ohms, ½ watt (R189)
18757	Resistor—18,000 ohms, 1 watt (R208), in some receivers
30492	Resistor—22,000 ohms, ½ watt (R162, R163, R217, R236)
71989	Resistor—22,000 ohms, 1 watt (R207)
71990	Resistor—27,000 ohms, 1 watt (R188, also R208 in some receivers)
30409	Resistor—27,000 ohms, ½ watt (R196, R221)
71084	Resistor—39,000 ohms, 1 watt (R197, R231)
71988	Resistor—47,000 ohms, 1 watt (R198)
30787	Resistor—47,000 ohms, ½ watt (R150)
30650	Resistor—56,000 ohms, ½ watt (R173)
3252	Resistor—100,000 ohms, ½ watt (R148, R166, R219, R220)

STOCK No.	DESCRIPTION
30493	Resistor—150,000 ohms, ½ watt (R151, also R239 in some receivers)
30651	Resistor—270,000 ohms, ½ watt (R225)
14983	Resistor—330,000 ohms, ½ watt (R224)
30648	Resistor—470,000 ohms, ½ watt (R138, R191, R192, R193, R205, R214)
30562	Resistor—680,000 ohms, ½ watt (R204, R238)
30161	Resistor—820,000 ohms, ½ watt (R142)
71993	Resistor—1 megohm, 1 watt (R235)
30652	Resistor—1 megohm, ½ watt (R149, R153, R157, R159, R229)
30162	Resistor—1.2 megohm, ½ watt (R143)
31449	Resistor—1.5 megohm, ½ watt (R171)
30649	Resistor—2.2 megohm, ½ watt (R167, R176)
30931	Resistor—4.7 megohm, ½ watt (R156)
31071	Resistor—6.8 megohm, ½ watt (R228)
30992	Resistor—10 megohm, ½ watt (R223)
71456	Screw—Wing screw for mounting of deflection yoke (3 required)
71452	Sleeve—Rubber sleeve for focus coil
71525	Socket—Kinescope socket
31251	Socket—Tube socket, octal, 8 contact
72516	Socket—Tube socket, miniature, 7 contact
71508	Socket—Tube socket for 8016 tube
71559	Spring—Grounding spring for hi-voltage filter capacitor
71453	Stud—Threaded stud for focus coil mounting brackets (2 required)
71427	Transformer—Sound discriminator transformer (T113, C199, C201, C202)
71419	Transformer—Audio output transformer (T114)
71424	Transformer—First or second sound i-f transformer (T111, T112, C190, C193, C195, C198)
71423	Transformer—First picture i-f transformer (T103, C117)
71425	Transformer—Second picture i-f transformer (T104, C124)
71416	Transformer—Horizontal output and hi-voltage transformer (T109)
71415	Transformer—Power transformer, 115 volts, 60 cycle (T110)
72775	Transformer—Power transformer, 115 volts, 50 cycle (T110)
71428	Transformer—Sync discriminator transformer (T108)
71418	Transformer—Vertical oscillator transformer (T106)
71417	Transformer—Vertical output transformer (T107)
71422	Trap—Sound trap (T105, C132)
71420	Yoke—Deflection yoke (L193, L194, L197, L198, C181, R180, R201)

SPEAKER ASSEMBLY

970121-1

STOCK No.	DESCRIPTION
71530	Speaker—5" E. M. speaker 62 ohms (field) complete with cone and voice coil
NOTE:	If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

MISCELLANEOUS

STOCK No.	DESCRIPTION
71860	Back—Cabinet back
X1623	Cloth—Grille cloth for walnut instruments
X1665	Cloth—Grille cloth for mahogany instruments
71982	Decal—"Brightness-Horizontal Vertical" decal
71983	Decal—"Off-On" and station selector decal
71984	Decal—Trade mark decal
71598	Escutcheon—Channel marker escutcheon
71985	Feet—Rubber feet 4 required)
71981	Glass—Safety glass
71535	Knob—Picture, brightness or vertical hold knob
71537	Knob—Dummy brightness control knob
71533	Knob—Fine tuning knob
71536	Knob—Horizontal hold or volume control knob
71534	Knob—Station selector knob
71539	Slide—Kinescope centering slide with rubber cushion (4 required)
71538	Spring—Spring clip for escutcheon
4982	Spring—Retaining spring for knob #71533
14270	Spring—Retaining spring for knob #71534, #71535 and #71537
30330	Spring—Retaining spring for knob #71536

Model 630TCS

RCA VICTOR

TELEVISION RECEIVER MODEL 630TCS

Chassis No. KCS 20B-1 (60 cycles) and KCS 20D-2 (50 cycles)—Mfr. No. 274

SERVICE DATA

—1947 No. T3—
SUPPLEMENT TO 1946 No. T1

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 630TCS is a thirty-tube, direct-viewing, 10" console model, Television Receiver. The receiver is complete in one unit and is operated by the use of seven front-panel controls. Features of the receiver include: Full thirteen channel coverage; F-M sound system; Improved picture brilliance; A-F-C horizontal hold; Stabilized vertical hold; Two stages of video amplification; Noise saturation circuits; Three stage sync separator and clipper; Four mc. band width for picture channel, and Reduced hazard high voltage supply.

The chassis employed in Model 630TCS is identical to that in the 630TS except for the separate twelve inch speaker and a pilot light used in the console model.

This publication includes all the data applicable only to the 630TCS such as the Installation Instructions, Wiring Diagram, Circuit Diagram and Replacement Parts List. For service information, refer to the Service Data for Model 630TS.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 6⅜" x 8½"—2" radius at corner

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 300 kc on channel 1, and plus and minus approximately 750 kc on channel 13.

POWER SUPPLY RATING

KCS 20-B1	115 volts, 60 cycles, 320 watts
KCS 20D-2	115 volts, 50 cycles, 320 watts

AUDIO POWER OUTPUT RATING

Undistorted	2.5 watts
Maximum	4 watts

LOUDSPEAKER (92567-3)

Type	12 inch Electro Magnet Dynamic
Voice Coil Impedance	2.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet, less kinescope	124 lbs.
Shipping Weight	153 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE..300 ohms balanced

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (Outside)	28	40⁷⁄₁₆	20⅜
Chassis Base (Outside)	19¼	3¾	15½
Chassis Overall	21¾	11¾	16⅛

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6BA6	2nd Sound I-F Amplifier
(6)	RCA 6AU6	3rd Sound I-F Amplifier
(7)	RCA 6AL5	Sound Discriminator
(8)	RCA 6AT6	1st Audio Amplifier
(9)	RCA 6K6GT	Audio Output
(10)	RCA 6AG5	1st Picture I-F Amplifier
(11)	RCA 6AG5	2nd Picture I-F Amplifier
(12)	RCA 6AG5	3rd Picture I-F Amplifier
(13)	RCA 6AG5	4th Picture I-F Amplifier
(14)	RCA 6AL5	Picture 2nd Detector and D-C Restorer
(15)	RCA 6AU6	1st Video Amplifier
(16)	RCA 6K6GT	2nd Video Amplifier
(17)	RCA 6SK7	1st Sync Amplifier
(18)	RCA 6SH7	Sync Separator
(19)	RCA 6SN7GT	2nd Sync Amplifier and Horizontal Discharge
(20)	RCA 6J5	Vertical Sweep Oscillator and Discharge
(21)	RCA 6K6GT	Vertical Sweep Output
(22)	RCA 6AL5	Horizontal Sync Discriminator
(23)	RCA 6K6GT	Horizontal Sweep Oscillator
(24)	RCA 6AC7	Horizontal Sweep Oscillator Control
(25)	RCA 6BG6G	Horizontal Sweep Output
(26)	RCA 5V4G	Horizontal Reaction Scanning
(27)	RCA 1B3-GT/8016	High Voltage Rectifier
(28)	RCA 5U4G	Power Supply Rectifiers (2 tubes)
(29)	RCA 10BP4	Kinescope

Specifications continued on page 2

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 Mc.
Adjacent Channel Sound Trap	27.25 Mc.
Accompanying Sound Traps	21.25 Mc.
Adjacent Channel Picture Carrier Trap	19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 Mc.
Sound Discriminator Band Width (between peaks)	350 kc

VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture Sound Volume and On-Off Switch	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Brightness	Single Control Knob

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustment
Height	rear chassis adjustment
Horizontal Linearity	top chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis adjustment
Horizontal Oscillator Frequency	rear chassis adjustment
Horizontal Oscillator Phase	bottom chassis adjustment
Focus	rear chassis adjustment
Focus Coil	top chassis wing nut adjustment
Ion Trap Magnet	top chassis thumb screw adjustment
Deflection Coil	top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

RECEIVER OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.
2. Set the STATION SELECTOR to the desired channel.
3. Turn the PICTURE control fully counter-clockwise.
4. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen then counter-clockwise until the glow just disappears.
5. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.
6. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.
7. Adjust the VERTICAL hold control until the pattern stops vertical movement.
8. Adjust the HORIZONTAL hold control until a picture is obtained and centered.
9. Adjust the PICTURE control for suitable picture contrast.
10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.
11. In switching from one station to another, it may be necessary to repeat steps number 6 and 9.
12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 6 is generally sufficient.
13. If the positions of the controls have been changed, it may be necessary to repeat steps number 1 through 9.

NOTE: If any difficulty is experienced with steps number 7 or 8, turn the PICTURE control ¼ turn counterclockwise and repeat those adjustments.

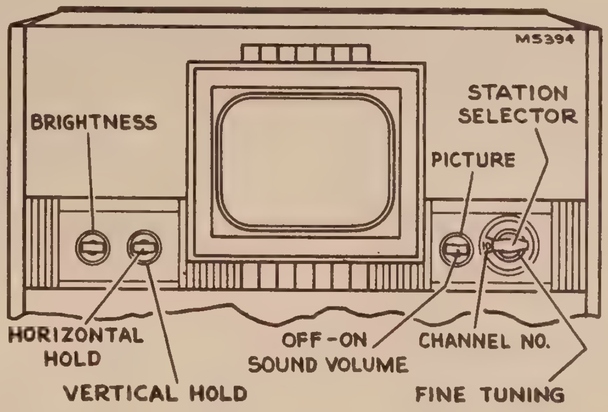


Figure 1—Receiver Operating Controls

INSTALLATION INSTRUCTIONS

The Model 630TCS television receiver is shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING—To unpack the receiver, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off of the cabinet.

The cabinet safety glass front panel is packed in a cardboard box and attached to the shipping skid. Remove the box and unpack the panel.

Take off the cabinet back. Remove the nuts from the two bolts which hold the cabinet to the skid. With a man on each end of the cabinet, lift the cabinet off the skid.

The operating control knobs are packed in a paper bag which is stapled to the inside of the cabinet. Remove the bag and install the knobs on the control shafts.

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets. Remove the protective cardboard tube from the dial light.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 2 for the location of the cushion and yoke adjustments.

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise, lower, or rotate the coil until alignment is obtained. Tighten the wingnuts with the coil in this position.

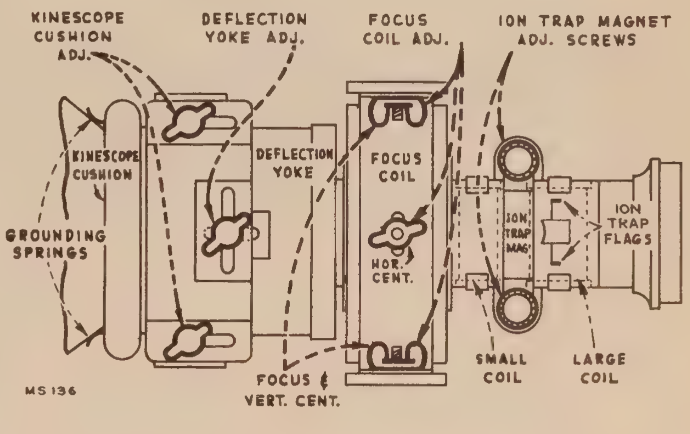


Figure 2—Yoke and Focus Coil Adjustments

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 3 for location of the slides and their adjustment screws. Loosen the ion trap magnet adjustment thumb screws.

KINESCOPE HANDLING PRECAUTION—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

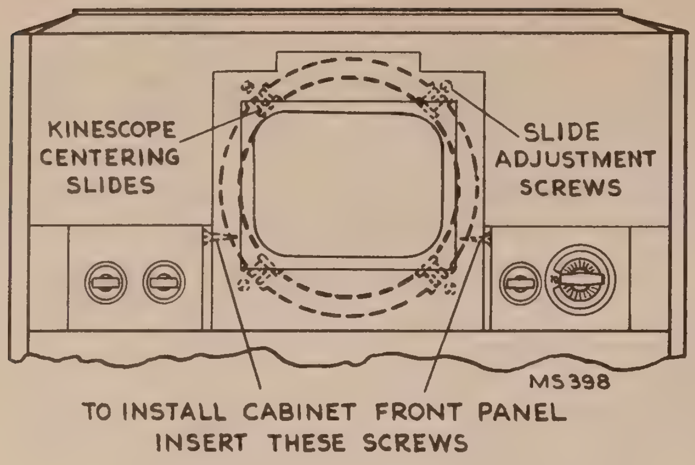

KINESCOPE CENTERING SLIDES
SLIDE ADJUSTMENT SCREWS
MS398
TO INSTALL CABINET FRONT PANEL INSERT THESE SCREWS

Figure 3—Cabinet, Front View

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 4. The kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 2.

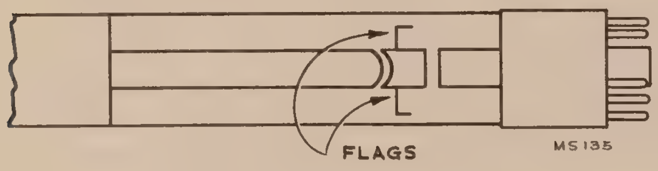


Figure 4—Ion Trap Flags

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 5 until the base of the tube protrudes approximately two inches beyond the focus coil. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

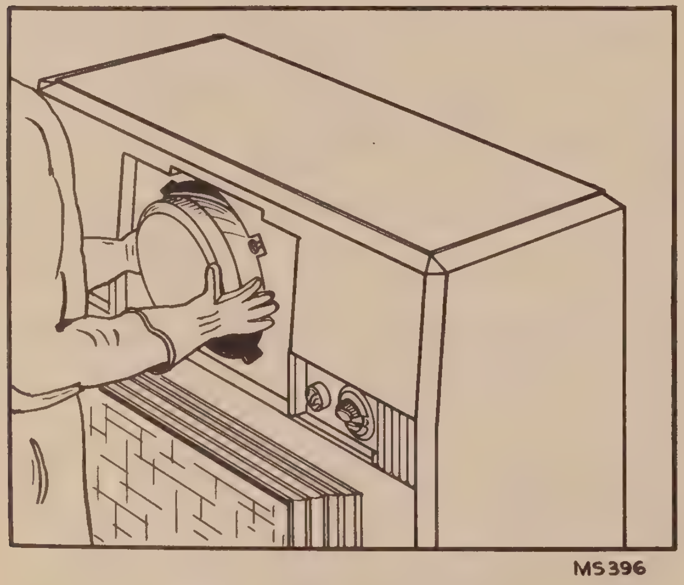


Figure 5—Kinescope Insertion

Slip the ion trap magnet on the neck of the kinescope with the large coil toward the base of the tube as shown in Figure 2. Connect the kinescope socket to the tube base. Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Install the cabinet front panel as indicated in Figure 3.

To install the front panel place the lip on the top of the panel in the recess above the kinescope opening and push the bottom in. Insert the two screws from the bag with the knobs into the side of panel as shown in Figure 3.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The ion trap rear magnet poles should be approximately over the ion trap flags as shown in Figure 2. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Tighten the magnet adjustment thumbscrews sufficiently to hold it in this position but still free enough to permit further adjustment. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R184 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R181 and R211 to mid position. See Figure 6 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

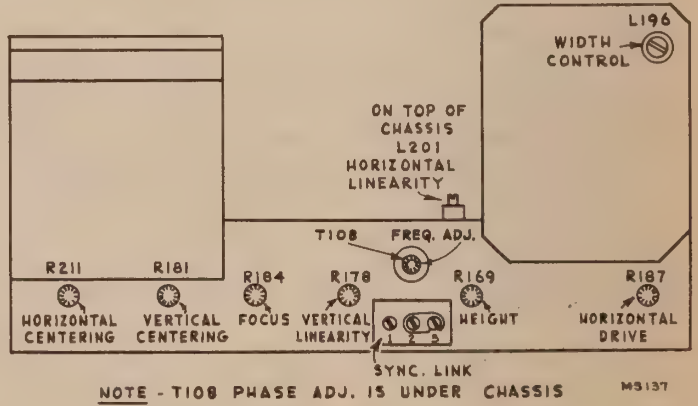


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 9 and the note of the receiver operating instructions on page 3.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—The sync link must be in the normal position (2 to 3). Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by turning the picture control fully counter-clockwise and then returning it to the operating position. Normally the picture will pull into sync.

Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator and proceed with 'FOCUS' adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove the signal. Turn the T108 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

With the sync link in the normal position (2-3), turn the T108 frequency adjustment (on rear apron), until the picture is synchronized. (If the picture is not synchronized vertically, adjust the vertical hold.) Adjust the picture control so that the picture is somewhat below average contrast level.

Turn the T108 phase adjustment screw (under chassis) until the blanking bar, which may appear in the picture, moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condition (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to the extreme counter-clockwise position. Turn T108 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counter-clockwise to the point where the picture falls in sync again.

Readjust T108 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to the extreme clockwise position. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase control.

Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T108 frequency adjustment counter-clockwise until the picture falls in sync.

Turn horizontal hold to the extreme counter-clockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

NOTE: If the picture does not pull in sync after momentary removals of the signal in both extreme positions of horizontal hold, the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory.

There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V124.

Excessive pull-in is objectionable because the higher sensitivity of the control circuits means also greater susceptibility to noise, and to the vertical sync and equalizing pulses which tend to cause a bend in the upper part of the raster. This effect is more noticeable when the sync link is in the 1-2 position.

FOCUS—Adjust the focus control R184 for maximum definition of the vertical wedge of the test pattern.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R169 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R178 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive (R187 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage to the kinescope second anode. Adjust the width control (L196 on rear chassis) until the picture just fills the mask horizontally (8½ inches). Adjust the horizontal linearity control L201 (see Figure 6) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust horizontal centering to align the picture with the mask.

If repeated adjustments of drive width and linearity fail to give proper linearity, it may be necessary to move the tap on R209, which is located in the high voltage compartment. Adjustments of drive, width and linearity must then be repeated.

Check to see that all cushion, yoke, focus coil and ion trap magnet thumb screws are tight. Replace the cabinet back. Make sure that the back is on tight, otherwise it may rattle at high volume.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal calibrated test oscillator or heterodyne frequency meter, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 21 of the Service Data for Model 630TS. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustments for channels 6 and 13 are under the chassis.

Tune in all available Television Stations. Observe the picture for detail, for proper interlacing and for the presence of interference or reflections. If these are encountered, see the section on antennas on page 26 of Model 630TS Service Data.

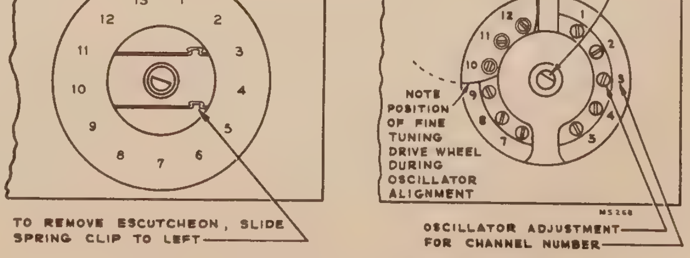
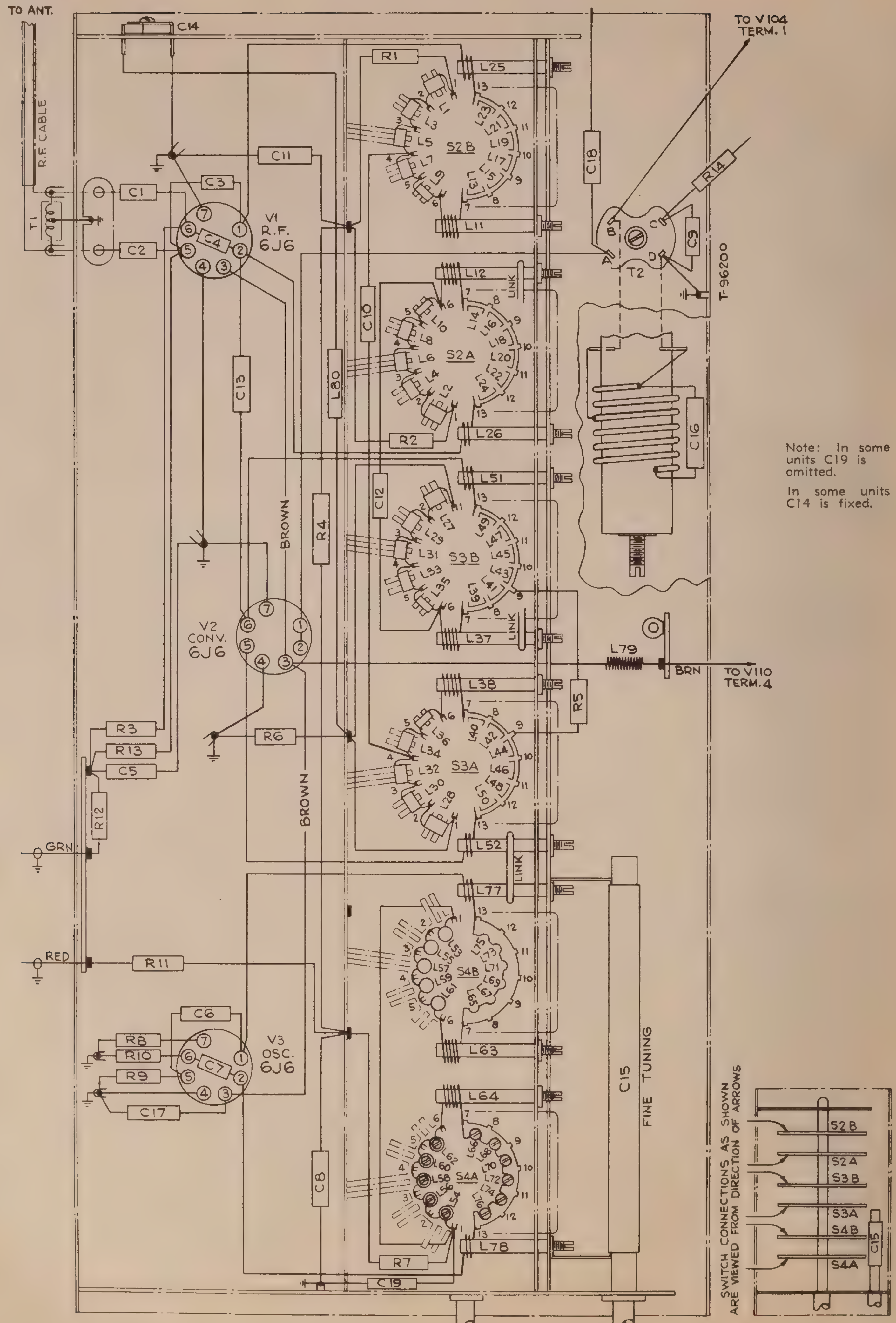

STATION SELECTOR
FINE TUNING
13
1
2
3
4
5
6
7
8
9
10
11
12
TO REMOVE ESCUTCHEON, SLIDE SPRING CLIP TO LEFT
NOTE POSITION OF FLAT WHEN SET FOR CHANNEL 1.
NOTE POSITION OF FINE TUNING DRIVE WHEEL DURING OSCILLATOR ALIGNMENT
OSCILLATOR ADJUSTMENT FOR CHANNEL NUMBER
MS268

Figure 7—R-F Oscillator Adjustments

R-F UNIT WIRING DIAGRAM


TO ANT.
R.F. CABLE
T1
C1
C2
C3
C4
C11
C14
V1
R.F.
6J6
R1
L25
L1
L3
L5
L7
L9
S2B
L23
L21
L19
L17
L15
L13
L11
C18
TO V104
TERM. 1
R14
C9
T2
T-96200
L12
LINK
L10
L8
L6
L4
L2
S2A
L14
L16
L18
L20
L22
L24
L26
R2
C10
C13
L80
C12
L51
L27
L29
L31
L33
L35
S3B
L49
L47
L45
L43
L41
L39
L37
C16
BROWN
R4
V2
CONV.
6J6
L79
BRN
TO V110
TERM. 4
R5
L38
L36
L34
L32
L30
L28
S3A
L40
L42
L44
L46
L48
L50
L52
R3
R13
C5
R6
R12
GRN
L77
L53
L55
L57
L59
L61
S4B
L75
L73
L71
L69
L67
L65
L63
RED
R11
C6
R8
R10
R9
C7
V3
OSC.
6J6
C17
L64
L62
L60
L58
L56
L54
S4A
L66
L68
L70
L72
L74
L76
L78
C8
R7
C19
C15
FINE TUNING
SWITCH CONNECTIONS AS SHOWN ARE VIEWED FROM DIRECTION OF ARROWS
S2B
S2A
S3B
S3A
S4B
S4A
C15

Note: In some units C19 is omitted.

In some units C14 is fixed.

Figure 8—R-F Unit Wiring Diagram

CHASSIS WIRING DIAGRAM

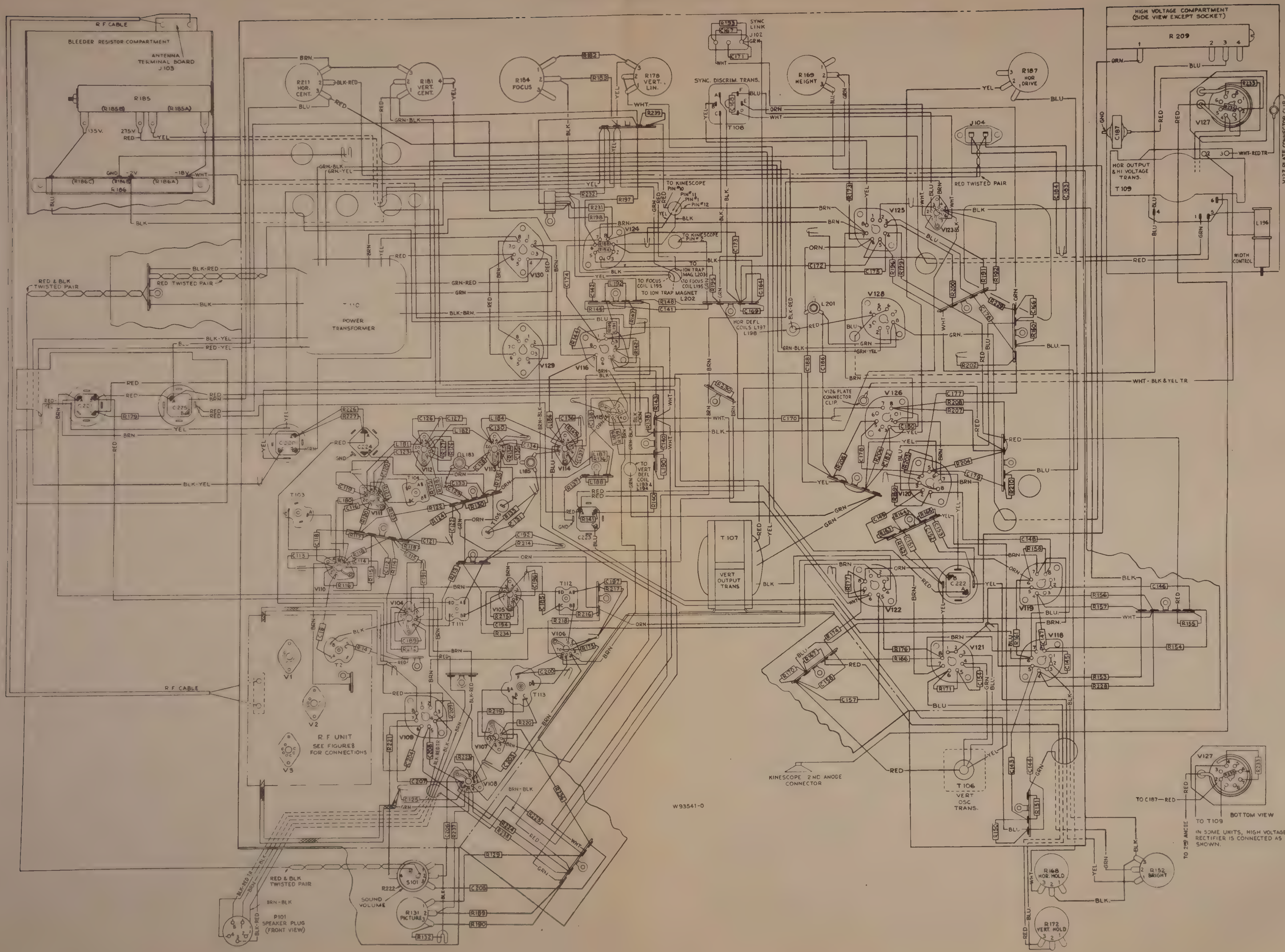
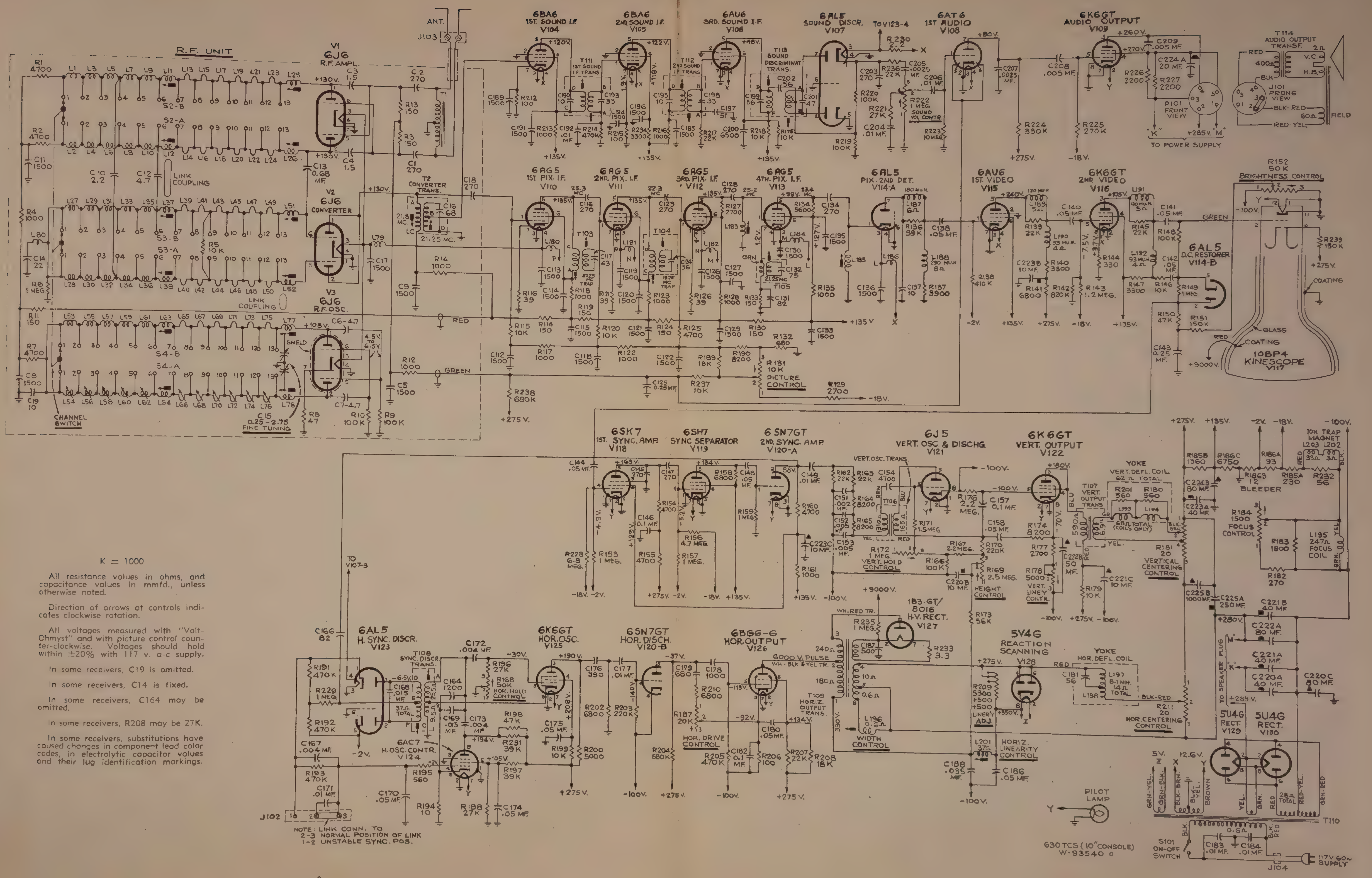

R F CABLE
BLEEDER RESISTOR COMPARTMENT
ANTENNA TERMINAL BOARD J 103
R185
R185B
R185A
135V.
275V.
-18V
GND
-2V
R186C
R186B
R186A
R186
R211 HOR. CENT.
R181 VERT. CENT.
R184 FOCUS
R178 VERT. LIN.
SYNC LINK J 102
SYNC. DISCRIM. TRANS.
T108
R169 HEIGHT
R187 HOR DRIVE
HIGH VOLTAGE COMPARTMENT (SIDE VIEW EXCEPT SOCKET)
R 209
V127
C187
HOR OUTPUT & HI VOLTAGE TRANS.
T 109
V127 PLATE CONNECTOR CLIP
J 104
RED TWISTED PAIR
L196
WIDTH CONTROL
TO KINESCOPE PIN #10
PIN #11
PIN #12
TO KINESCOPE PIN # 2
TO ION TRAP MAG. L203
TO FOCUS COIL L195
TO ION TRAP MAGNET L202
HOR DEFL COILS L197 L198
RED & BLK TWISTED PAIR
RED TWISTED PAIR
T110 POWER TRANSFORMER
V130
V129
V124
V125
V123
V128
L201
V126 PLATE CONNECTOR CLIP
V126
V116
V115
V114
V113
V112
V111
V110
T103
T104
TO VERT DEFL COIL L193 L194
T 107 VERT OUTPUT TRANS
V120
V122
V119
V118
V121
C222
C220
C224
C225
C221
V104
V105
T111
T112
V106
V1
V2
V3
R F UNIT SEE FIGURE 8 FOR CONNECTIONS
R F CABLE
V109
V107
V108
T113
KINESCOPE 2ND ANODE CONNECTOR
W 93541-0
T 106 VERT OSC TRANS.
S101
R222
SOUND VOLUME
R131 PICTURE
RED & BLK TWISTED PAIR
P101 SPEAKER PLUG (FRONT VIEW)
R168 HOR. HOLD
R172 VERT. HOLD
R152 BRIGHT
V127
TO C187
TO T109
TO 2ND ANODE
BOTTOM VIEW
IN SOME UNITS, HIGH VOLTAGE RECTIFIER IS CONNECTED AS SHOWN.
WHT - BLK & YEL TR
WHT-RED TR

Figure 9—Chassis Wiring Diagram

CIRCUIT SCHEMATIC DIAGRAM


R.F. UNIT
ANT.
J103
V1 6J6 R.F. AMPL.
V2 6J6 CONVERTER
V3 6J6 R.F. OSC.
T1
T2 CONVERTER TRANS.
21.8 MC.
21.25 MC.
LINK COUPLING
CHANNEL SWITCH
C15 0.25-2.75 FINE TUNING
RED
GREEN
6BA6 1ST. SOUND I.F. V104
6BA6 2ND SOUND I.F. V105
6AU6 3RD. SOUND I.F. V106
6AL5 SOUND DISCR. V107
T111 1ST SOUND I.F. TRANS.
T112 2ND SOUND I.F. TRANS.
T113 SOUND DISCRIMINAT TRANS.
TO V123-4
6AT6 1ST AUDIO V108
R222 1 MEG SOUND VOL. CONTR
6K6GT AUDIO OUTPUT V109
T114 AUDIO OUTPUT TRANSF.
P101 FRONT VIEW
J101 PRONG VIEW
TO POWER SUPPLY
FIELD
6AG5 1ST. PIX. I.F. V110
6AG5 2ND. PIX. I.F. V111
6AG5 3RD. PIX. I.F. V112
6AG5 4TH. PIX. I.F. V113
T103
T104
T105
6AL5 PIX. 2ND DET. V114-A
R131 10K PICTURE CONTROL
6AU6 1ST. VIDEO V115
6K6GT 2ND. VIDEO V116
R152 50K BRIGHTNESS CONTROL
6AL5 D.C. RESTORER V114-B
10BP4 KINESCOPE V117
GLASS
COATING
+9000V.
6SK7 1ST. SYNC. AMP V118
6SH7 SYNC SEPARATOR V119
6SN7GT 2ND. SYNC. AMP V120-A
6J5 VERT. OSC. & DISCHG V121
VERT. OSC. TRANS.
R172 1 MEG. VERT. HOLD CONTROL
R169 2.5 MEG. HEIGHT CONTROL
6K6GT VERT. OUTPUT V122
T107 VERT. OUTPUT TRANS.
R178 5000 VERT. LINEY CONTR.
YOKE VERT. DEFL. COIL 62 Ω TOTAL
R181 20 VERTICAL CENTERING CONTROL
ION TRAP MAGNET
BLEEDER
R184 1500 FOCUS CONTROL
L195 247Ω FOCUS COIL
TO V107-3
6AL5 H. SYNC. DISCR. V123
T108 SYNC DISCR. TRANS.
R168 50K HOR. HOLD CONTROL
6K6GT HOR. OSC. V125
6AC7 H. OSC. CONTR. V124
6SN7GT HOR. DISCH. V120-B
6BG6-G HOR. OUTPUT V126
R187 20K HOR. DRIVE CONTROL
T109 HORIZ. OUTPUT TRANS.
6000 V. PULSE
WIDTH CONTROL
1B3-GT/8016 H.V. RECT. V127
5V4G REACTION SCANNING V128
R209 LINEAR'Y ADJ.
L201 HORIZ. LINEARITY CONTROL
YOKE HOR. DEFL. COIL
R211 20 HOR. CENTERING CONTROL
TO SPEAKER PLUG
5U4G RECT. V129
5U4G RECT. V130
T110
S101 ON-OFF SWITCH
J104
117V. 60~ SUPPLY
PILOT LAMP
J102
NOTE: LINK CONN. TO 2-3 NORMAL POSITION OF LINK 1-2 UNSTABLE SYNC. POS.
630TCS (10" CONSOLE) W-93540 0

K = 1000

All resistance values in ohms, and capacitance values in mmfd., unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "Volt-Ohmyst" and with picture control counter-clockwise. Voltages should hold within ±20% with 117 v. a-c supply.

In some receivers, C19 is omitted.

In some receivers, C14 is fixed.

In some receivers, C164 may be omitted.

In some receivers, R208 may be 27K.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

Figure 10—Circuit Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
65401	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section or channel #1 convertor grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channels #2 and 3 r-f amplifier plate coil—front or rear section or channels #2 and 4 convertor grid coil—front or rear section (L3, L4, L5, L6, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 convertor grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, convertor grid or r-f amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 convertor grid or r-f amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 convertor grid or r-f amplifier plate coil—front section (L26, L52)
72597	Coil—Channel #3 convertor grid coil—front or rear section (L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, 3 and 4 oscillator coil—front sections (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Convertor grid trap coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front and rear oscillator coils' adjustable core and stud
71498	Core—Channel #13 front and rear convertor grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
72498	Core—Channel #6 front and rear convertor grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71463	Detent—Detent mechanism and fiber shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for Channels #6 and 13 coils—less winding
71462	Loop—Oscillator to convertor grid coupling loop
30732	Resistor—47 ohms, ½ watt (R8)
30880	Resistor—150 ohms, ½ watt (R3, R11, R13)
34766	Resistor—1000 ohms, ½ watt (R4, R12, R14)
30494	Resistor—4700 ohms, ½ watt (R1, R2, R7)
3078	Resistor—10,000 ohms, ½ watt (R5)
3252	Resistor—100,000 ohms, ½ watt (R9, R10)
30652	Resistor—1 megohm, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4—40 x 15/32" adjusting screw for coils (L54, L56, L58, L60, L62)
71476	Screw—# 4—40 x ¼" binder head screw for adjusting coils (L66, L68, L70, L72, L74, L76)
71473	Segment—Convertor grid section front segment—less coils or r-f amplifier plate section front segment—less coils (Part or S3 or Part of S2)
71474	Segment—Convertor grid section rear section less coils or r-f amplifier plate section rear segment—less coils (Part of S3 or Part of S2)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator segment rear section—less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold disc
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer Convertor transformer (T2) (C16)
	CHASSIS ASSEMBLIES KCS20B-1
71894	Bearing—Bearing for r-f unit shaft
71460	Board—"Antenna" terminal board (J103)
71454	Board—Sync Link Terminal board, 3 terminals with link (J102)
71524	Cable—R-F cable (from r-f unit to J103)
71532	Cap—Hi-voltage rectifier and horizontal output tube plate cap
39604	Capacitor—Mica, 10 mmf. (C137)
71771	Capacitor—Ceramic, 51 mmf. (C197)
39626	Capacitor—Mica, 82 mmf. (C166)
71514	Capacitor—Ceramic, 82 mmf. (C131)
39638	Capacitor—Mica, 270 mmf. (C116, C123, C128, C134, C145, C147, C203)
39642	Capacitor—Mica, 390 mmf. (C176)
71450	Capacitor—Hi-voltage filter—500 mmf. (C187)
39648	Capacitor—Mica, 680 mmf. (C179)
72638	Capacitor—Ceramic, 1200 mmf. (C164)
71501	Capacitor—Ceramic, 1500 mmf. (C112, C113, C114, C115, C118, C119, C120, C121, C122, C126, C127, C129, C130, C133, C135, C136, C185, C189, C191, C194, C196)
39668	Capacitor—Mica, 4700 mmf. (C154)
71690	Capacitor—Ceramic, 6500 mmf. (C200)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C178)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C151)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C205, C207)
70647	Capacitor—Tubular, .004 mfd., 1000 volts (C167)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C172, C173)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C152, C153, C208, C209)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C149, C177, C192, C204, C206, C171)
71770	Capacitor—Moulded paper, .01 mfd., 400 v (C183, C184)
71516	Capacitor—Tubular, impregnated, .015 mfd., 400 volts (C168, C169)
71518	Capacitor—Tubular, impregnated, .035 mfd., 600 volts (C188)
71515	Capacitor—Tubular, impregnated, .05 mfd., 600 volts (C158, C186)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C138, C140, C141, C142, C144, C148, C170, C174, C175, C180)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C146, C157, C182)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C125, C143)
71435	Capacitor—Electrolytic, comprising 20 mfd., 450 volts and 80 mfd., 350 volts (C224a, C224b)
71434	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 10 mfd., 450 volts and 10 mfd., 350 volts (C223a, C223b, C223c)
71431	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 10 mfd., 450 volts and 80 mfd., 150 volts (C220a, C220b, C220c)
71432	Capacitor—Electrolytic, comprising 40 mfd., 450 volts; 40 mfd., 450 volts and 10 mfd., 450 volts (C221a, C221b, C221c)
71433	Capacitor—Electrolytic, comprising 80 mfd., 450 volts and 50 mfd., 50 volts (C222a, C222b)
71436	Capacitor—Electrolytic, comprising 250 mfd., 10 volts and 1000 mfd., 6 volts (C225a, C225b)
71426	Coil—Third or fourth picture i-f coil (L183, L185)
71505	Coil—Choke coil (L180, L181, L182, L184, L186)
71421	Coil—Focus coil (L195)
71449	Coil—Horizontal linearity control coil (L201)
71527	Coil—Peaking coil—93 mu.h. (L190, L192)
71529	Coil—Peaking coil—120 mu.h. (L189, L191, R139, R145)
71528	Coil—Peaking coil—180 mu.h. (L187, R136)
71526	Coil—Peaking coil—250 mu.h. (L188)
71429	Coil—Width control coil (L196)
71523	Connector—Kinescope anode connector
71521	Connector—Hi-voltage capacitor connector
71444	Control—Brightness control (R152)
71446	Control—Picture control sound volume control and power switch (R131, R222, S101)
71442	Control—Focus control (R184)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71447	Control—Horizontal drive control (R187)
71445	Control—Vertical and horizontal hold control (R168, R172)
71443	Control—Vertical or horizontal centering control (R181, R211)
71440	Control—Vertical height control (R169)
71441	Control—Vertical linearity control (R178)
71457	Cord—Power cord
71437	Cover—Insulating cover for electrolytics #71431 and #71433
71510	Cushion—Deflection yoke hood bottom cushion
71509	Cushion—Deflection yoke hood upper cushion
71522	Magnet—Ion trap magnet (L202, L203)
71451	Nut—Speed nut to mount capacitor #71450
71455	Nut—Wing nut for mounting of focus coil (3 required)
18469	Plate—Mounting plate for electrolytics #71431 and #71433
71448	Plug—2 prong male plug for power cable
12493	Plug—5 contact female plug for speaker cable
71918	Resistor—2.2 ohms, 1 watt (R230)
71513	Resistor—3.3 ohms, ⅓ watt (R233)
34761	Resistor—10 ohms, ½ watt (R194)
11956	Resistor—39 ohms, ½ watt (R116, R121, R126)
71992	Resistor—56 ohms, 1 watt (R232)
34765	Resistor—100 ohms, ½ watt (R212, R215)
70715	Resistor—100 ohms, 1 watt (R206)
30880	Resistor—150 ohms, ½ watt (R114, R119, R124, R130, R133)
71511	Resistor—270 ohms, 2 watt (R182)
8063	Resistor—330 ohms, ½ watt (R144)
5164	Resistor—560 ohms, ½ watt (R195)
12262	Resistor—680 ohms, ½ watt (R132)
34766	Resistor—1000 ohms. ½ watt (R117, R118, R122, R123, R128, R135, R161, R213, R216)
71458	Resistor—Wire wound resistor, 1360 ohms, 17 watt, and 230 ohms, 10 watt (R185a, R185b)
71512	Resistor—1800 ohms, 1 watt (R183)
34769	Resistor—2200 ohms, 2 watt (R226, R227)
30730	Resistor—2700 ohms, ½ watt (R127, R129, R177)
30733	Resistor—3300 ohms, ½ watt (R140, R234)
71986	Resistor—3300 ohms, 1 watt (R147)
30694	Resistor—3900 ohms, ½ watt (R137)
71987	Resistor—4700 ohms, 1 watt (R154, R155)
30494	Resistor—4700 ohms, ½ (R125, R160)
71861	Resistor—5000 ohms, 5 watt (R200)
71439	Resistor—Wire wound resistor—5300 ohms, 20 watt; 500 ohms, 2 watt and 500 ohms, 2 watt (R209)
30734	Resistor—5600 ohms, ½ watt (R134)
71459	Resistor—Voltage divider resistor—6750 ohms, 3.2 watt; 12 ohms, 0.5 watt and 93 ohms, 4 watt (R186a, R186b, R186c)
14659	Resistor—6800 ohms, ½ watt (R141, R158, R202, R210)
14250	Resistor—8200 ohms, ½ watt (R164, R165, R174, R190)
71914	Resistor—10,000 ohms, 1 watt (R179, R199, R218)
3078	Resistor—10,000 ohms, ½ watt (R115, R120, R146, R175, R237)
3219	Resistor—18,000 ohms, ½ watt (R189)
18757	Resistor—18,000 ohms, 1 watt (R208)
30492	Resistor—22,000 ohms, ½ watt (R162, R163, R217, R236)
71989	Resistor—22,000 ohms, 1 watt (R207)
71990	Resistor—27,000 ohms, 1 watt (R188)
30409	Resistor—27,000 ohms, ½ watt (R196, R221)
71084	Resistor—39,000 ohms, 1 watt (R197, R231)
71988	Resistor—47,000 ohms, 1 watt (R198)
30787	Resistor—47,000 ohms, ½ watt (R150)
30650	Resistor—56,000 ohms, ½ watt (R173)
3252	Resistor—100,000 ohms, ½ watt (R148, R166, R219, R220)
30493	Resistor—150,000 ohms, ½ watt (R151, R239)
14583	Resistor—220,000 ohms, ½ watt (R170, R203)
30651	Resistor—270,000 ohms, ½ watt (R225)
14983	Resistor—330,000 ohms, ½ watt (R224)
30648	Resistor—470,000 ohms, ½ watt (R138, R191, R192, R193, R205, R214)
30562	Resistor—680,000 ohms, ½ watt (R204, R238)
30161	Resistor—820,000 ohms, ½ watt (R142)
71993	Resistor—1 megohm, 1 watt (R235)
30652	Resistor—1 megohm, ½ watt (R149, R153, R157, R159, R229)
30162	Resistor—1.2 megohms, ½ watt (R143)
31449	Resistor—1.5 megohms, ½ watt (R171)
30649	Resistor—2.2 megohms, ½ watt (R167, R176)
30931	Resistor—4.7 megohms, ½ watt (R156)
31071	Resistor—6.8 megohms, ½ watt (R228)
30992	Resistor—10 megohms, ½ watt (R223)
71456	Screw—Wing screw for mounting of deflection yoke (3 required)
71452	Sleeve—Rubber sleeve for focus coil
71525	Socket—Kinescope socket
35574	Socket—Lamp socket
31251	Socket—Tube socket, octal, 8 contact
72516	Socket—Tube socket, miniature, 7 contact
71508	Socket—Tube socket for 8016 tube
71559	Spring—Grounding spring for hi-voltage filter capacitor
71453	Stud—Threaded stud for focus coil mounting brackets (2 required)
71427	Transformer—Sound discriminator transformer T113 (C199, C201, C202)
71424	Transformer—First or second sound i-f transformer (T111, T112, C190, C193, C195, C198)
71423	Transformer—First picture i-f transformer T103 (C117)
71425	Transformer—Second picture i-f transformer T104 (C124)
71418	Transformer—Vertical oscillator transformer (T106)
71417	Transformer—Vertical output transformer (T107)
71428	Transformer—Horizontal sync discriminator transformer (T108)
71416	Transformer—Horizontal output and hi-voltage transformer (T109)
71415	Transformer—Power transformer 115 volts, 60 cycle (T110)
72775	Transformer—Power transformer, 115 volts, 50 cycle (T110)
71422	Trap—Cathode trap T105 (C132)
71420	Yoke—Deflection yoke (L193, L194, L197, L198, C181, R180, R201)

SPEAKER ASSEMBLIES
RL70R4
92567-3W

STOCK No.	DESCRIPTION
13867	Cap—Dust cap
71557	Coil—Field coil (60 ohms)
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
71560	Plug—5 prong male plug for speaker
71556	Speaker—12" E. M. Speaker (60 ohm field) complete with cone and voice coil less transformer and plug
71145	Suspension—Metal cone suspension
31301	Transformer—Output transformer

NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

MISCELLANEOUS

STOCK No.	DESCRIPTION
71911	Back—Cabinet back
71599	Bracket—Lamp bracket
13103	Cap—Pilot lamp cap
71982	Decal—"Brightness-Horizontal Vertical" decal for walnut or standard mahogany instruments
71983	Decal—"Off-On" and station selector decal for walnut or standard mahogany instruments
72826	Decal—Control function decal for blonde mahogany instruments
71984	Decal—Trade mark decal
71598	Escutcheon—Channel marker escutcheon
72755	Glass—Safety glass
X1642	Grille—Grille cloth for walnut cabinet
71533	Knob—Fine tuning knob
71534	Knob—Station selector knob
71535	Knob—Picture, vertical hold or brightness knob
71536	Knob—Horizontal hold or power and volume control knob
71537	Knob—Dummy knob on brightness control
31480	Lamp—Pilot lamp
72754	Pull—Cabinet door pull
71539	Slide—Kinescope centering slide with rubber cushion (4 required)
4982	Spring—Retaining spring for knob #71533
14270	Spring—Retaining spring for knob #71534, #71535, #71537
30330	Spring—Retaining spring for knob #71536
71538	Spring—Spring clip for escutcheon

417. Gane
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